Non-Public JSC "Kazakh National Research Technical University named after K. Satpaev"
Institute of Architecture, Construction and Energetics named after TK Basenov
Department of Building and Building Materials

CURRICULUM PROGRAM

"Civil Engineering"
Bachelor of Engineering and Technology
in area 6B0730 Construction and production of building materials and structures

on the basis of the following specialties of the invalidated Classifier of specialties:
5B072900 "Construction", 5B073000 "Production of building materials, products and structures"
5B075200 "Engineering systems and networks", 5B080500 "Water resources and water use"

1st edition
in accordance with the SOSU of higher education in 2018

Almaty, 2018

Программа составлена и подписана сторонами:

от КазНИТУ им К.И. Сатпаева:

1. Заведующий кафедрой Кызылбаев Н.К.
2. Директор Института Куспангалиев Б.У.
3. Председатель УМГ кафедры, ассоц. профессор Наширалиев Ж.Т.

От работодателей:

1. Сопредседатель Консультативного совета Института, директор ТОО «Сұлутөр» Жаутиков Е.Ж.

Утверждено на заседании Учебно-методического совета Казахского национального исследовательского технического университета им К. Сатпаева. Протокол №3 от 19.12.2018 г.

Квалификация:
Уровень 6 Национальной рамки квалификаций:
07 Инженерные, обрабатывающие и строительные отрасли:
073 Архитектура и строительство:
6В0730 Строительство и производство строительных материалов и конструкций (бакалавр).

Brief description of the program

The field of professional activity can be the following industries: construction, engineering, chemical, mining, petroleum, gas, industry, production.

The objects of professional activity are: construction and assembly management and organizations, design organizations, factories for the production of construction products, utilities, enterprises for the exploitation and repair of construction machinery and equipment, joint-stock construction associations, laboratories for quality control and certification of building materials and construction.

Subjects of professional activity: organization and carrying out construction and installation works, organization and carrying out work on the operation of buildings and technical equipment, work in scientific research organizations under the guidance of leading experts, calculation, design and production of building materials, products and structures.

Types of professional activity. Bachelors in the specialty 6B0730 "Construction and production of building materials and structures" can perform the following types of professional activity:

- production and management - to manage teams that carry out construction and installation work on the construction, operation and renovation of buildings, structures, engineering systems and equipment; on the operation and repair of construction machinery, mechanical, electrical equipment and automation equipment; technological lines for the production of building materials, products and structures;
- design - to perform design work on the construction and renovation of buildings and structures, engineering systems, mechanical and electrical equipment, and means of mechanization; selection of building materials.
- organizational and technological - to organize the work of construction, municipal, industrial organizations and enterprises;
- scientific and pedagogical - to participate in the implementation of scientific research works and conduct scientific and educational activities in general target organizations.

Areas of professional activity: design, construction and operation of civil, industrial, transport, public utilities and the production of building materials, products and structures.

The content of professional activity: to make calculations of elements of buildings and structures, to draw up technical solutions, to participate in the development of technical specifications for construction and reconstruction taking into account the requirements of ecology and life safety, to perform construction and installation work, selection of the composition and technological lines for release of building materials and designs.

Entry Requirements

Admission of applicants to higher educational institutions is carried out on applications on a competitive basis in accordance with the points of the certificate issued on the basis of the results of the unified national testing (UNT) or integrated testing (CT), conducted by the technologies developed by the National Testing Center (NTC) of the MES RK, on the basis of Model rules for admission to studies in educational organizations that implement vocational curricula for higher education, approved by a decree of the Government of the Republic of Kazakhstan on "19» January 2012 No. 111 (with changes and additions as of 07/04/2014). The applicant must have a state document on secondary (full) general education or secondary vocational education.The specialty 6B0730 "Construction and production of building materials and structures" at the Kazakh National Research Technical University named after K. Satpayev enrolls graduates of secondary education of the current year, who have passed the UNT and participants of complex testing, who scored at least 65 points according to test results.

Applicants are tested in the following subjects:the state or Russian language (language of instruction), history of Kazakhstan, mathematics and physics. Students are enrolled in the event that they receive at least 7 points in mathematics, and in other subjects at least 4 points. In the case of receiving one of the subjects passed under the UNT or integrated testing, less than 4 points, persons are not allowed to enroll in paid education or participate in the competition for the award of educational grants.

Code	Type of competence	Competency description	Result of competence	Responsible
GENERAL (It implies full training with possible additional depending on the level of knowledge)				
G1	Communication skills	- Fluent mono-speaking oral, written and communication skills - ability not fluent communication with a second language - Ability to use communicative communication in different situations - there are the basics of academic writing in their native language - language level diagnostic test	Full 4-year education with the development of at least 240 academic credits (of which 120 contact academic lending) with the possible transfer of credits in the second language where students have an advanced level. The language level is determined by taking a diagnostic test.	Department of Kazakh and Russian, Department of English
G2	Math literacy	- Basic mathematical thinking at the communication level - the ability to solve situational problems based on the mathematical apparatus of algebra and began mathematical analysis	Full 4-year study with the development of at least 240 academic credits (of which 120 contact academic lending). If the diagnostic test is passed positively, the level is Mathematics 1, if it is negative,	Department of Math

		- diagnostic test for mathematical literacy in algebra	the level is Algebra and the analysis is started	
G3	Basic literacy in science education	- basic understanding of the scientific picture of the world with an understanding of the essence of the fundamental laws of science - understanding of the basic hypotheses, laws, methods, formulation of conclusions and evaluation errors	Full 4-year study with the development of at least 240 academic credit (including contact 120 auditory academic credits). When the positive delivery of diagnostic test level 1 Physics, General Chemistry, with a negative - the level of early physics and basic fundamentals of chemistry	Chair in the field of science
SPECIFIC (Implies abbreviated training at the expense of credit transfer, depending on the level of knowledge on competencies for graduates of 12-year-olds in schools, colleges, high schools, including the humanitarian and economic trends)				
S1	communicative	- Runaway bilingual oral and written communication skills - the ability to communicate with not fluent in a third language - skills in writing texts of various style and genre - skills of understanding and interpretation of his own work a certain level of complexity (the essay) - basic theoretical and aesthetic literacy as a condition of full perception, interpretation of the original text	Full credit transfer for languages (Kazakh and Russian)	Chair of Kazakh and Russian language
S2	Mathematical literacy	- Special mathematical reasoning using deduction and induction, generalization and concretization, analysis and synthesis, classifying and organizing, and abstracting analogy - the ability to formulate, validate and prove the situation - application of general mathematical terms, formulas, and the extended spatial perception to mathematical problems	Perezachet credits on discipline Mathematics (Calculus) I	Department of Math

		- a thorough understanding of the basics of mathematical analysis		
S3	Special literacy in natural sciences (Physics, Chemistry, Biology and Geography)	- Extensive scientific perception of the world, is now intended to deeper understanding of natural phenomena - critical perception for understanding scientific phenomena of the world - cognitive ability to formulate a scientific understanding of the forms of existence of matter, its interactions and occurrences in nature	ECTS in Physics I, General Chemistry, General Biology, Introduction to geology, introduction to geodesy; Teaching practice, etc.	Chair in the field of science
S4	English	- readiness to further self-education in the English language in various fields - the willingness to acquire experience in the design and research work using English	Perezachet English loans above the level of the academic to the professional (15 credits)	Department of English
S5	Computer skills	- Basic programming skills on a modern language - the use of software and applications for training in various disciplines -availability global certification standard for the level of language	ECTS in the discipline Introduction to Information and Communication Technology, Information and Communication Technologies	Department of Software Engineering
S6	Social and humanitarian competence and behavior	- understanding and awareness of the responsibility of each citizen for the development of the country and the world - The ability to discuss the ethical and moral aspects of society, culture and science	Credit Transfer on Modern History of Kazakhstan (except for state exam)	The department of social sciences
		- critical awareness and the ability to debate for debating on current scientific hypotheses and theories	ECTS philosophy and other humanities	
PROFESSIONAL (implies abbreviated training at the expense of credit transfer, depending on the level of knowledge on competencies for college graduates, AB schools and universities, including the humanitarian and economic trends)				
P1	professional competence	- critical perception and deep understanding of professional	ECTS on basic professional disciplines, including an	producing department

		competences at the level of 5 or 6 - The ability to discuss and debate on professional issues in the framework of implementation of the program	introduction to the profession, the structure and design of machines and systems for industry, servicing of machines for industry educational and industrial practice	
P2	general engineering competence	- basic general engineering skills and knowledge, the ability to solve general engineering tasks and problems - be able to use software packages for the analysis of experimental data, solving systems of algebraic and differential equations	ECTS of engineering disciplines (engineering graphics, descriptive geometry, basics of mechanics, fluid dynamics basics, basics of electrical engineering, microelectronics bases, fundamentals of thermodynamics, basics of geology, etc.)	producing department
P3	Engineering and computer competence	- the basic skills to use computer programs and softsistem solutions for general engineering tasks	Credit transfer in the following disciplines of computer graphics, the basics of CAD, CAE basics etc.	producing department
P4	Engineering and operational competence	- the skills and ability to use technical means and experimental tools for solving general engineering tasks	ECTS academic disciplines pilot areas: turning, plumbing, repair business, welding business, laboratory or analytical chemistry, laboratory physics, mineralogy, etc.	producing department
P5	Socio-economic competence	- Critical understanding and cognitive ability to reason by modern social and economic issues - Basic understanding of economic evaluation of the objects of study and profitability of the sector projects	ECTS for socio-humanitarian, technical and economic subjects in elective credit cycle	producing department

University may refuse to credit transfer is confirmed if the low level of diagnostic or subjects completed the final grades were lower than A and B.

Requirements for completion of training and a diploma

- *Description of mandatory standard requirements for graduation and awarding academic degrees of Bachelor of engineering and technology in the field of* construction, engineering systems and production of Building Materials and structures: the development of at least 240 academic credits of theoretical training and the final thesis.

Working curriculum of the educational program

Year of study	Code	Name of disciplines	Cycle	Total loans	classroom volume lx / lab / pr/ISW	Reload code	prerequisite	Code	Name of disciplines	Cycle	Total loans	classroom volume lx / lab / pr/ISW	Reload code	prerequisite
1	1 semester							2 semester						
	LNG 1051	Beginner (A1)	G	6	0/0/ 3/3	S4	Diagnostician. Test	LNG 1052	Elementary English (A1)	G	6	0/0/ 3/3	S4	LNG 1051
	LNG 1052	Elementary English (A1)						LNG 1053	General English 1 (A2)					LNG 1052
	LNG 1053	General English 1 (A2)						LNG 1054	General English 2 (A2)					LNG 1053
	LNG 1054	General English 2 (A2)						LNG 1055	Academic English (B1)					LNG 1054
	LNG 1055	Academic English (B1)						LNG1056	Business English (B2)					LNG 1055
	LNG1 056	Business English (B2)						LNG 1057	Professional English (B2+)					LNG1056
	LNG1 012	Kazakh (Russian) language (A2)	G	4	0/0/ 2/2	S1	Diagnostician. Test	LNG1102.1	Academic Kazakh (Russian) language (B1)	G	4	0/0/ 2/2	S1	LNG10121
	LNG1 012.1	Academic Kazakh (Russian) language (B1)						LNG1102.2	Business Kazakh (Russian) language (B2)					LNG1012.1
	LNG1 012.2	Business Kazakh (Russian) language (B2)						1106	ELECTIVE					LNG1012.2
	MAT1 00	Algebra and beginning of mathematical analysis	B	6	2/0/ 1/3	S2	Diagnostician. Test	MAT1 01	Mathematics I	B	6	2/0/ 1/3	no	MAT1 00
	MAT1 01	Mathematics I						MAT1 02	Mathematics II					MAT1 01
	PHY1 10	Beginnings of physics	B	6	1/1/ 1/3	S3	Diagnostician. Test	PHY111	Physics I	B	6	1/1/ 1/3	no	PHY110
	PHY1 11	Physics I						PHY112	Physics II					PHY111
	CIV114	Building Materials	B	6	1/1/ 1/3			HUM113	Modern history of Kazakhstan	G	6	2/0/ 1/3	S6	нет
	GEN101	Engineering and Computer Graphics	B	6	1/0/ 2/3	no		CIV110	Geodesy in construction	B	6	1/0/ 2/3		
	AAP106	Physical education I	G	4	0/0/ 2/2			CHE 192	General chemistry*			1/1/ 1/3		
								AAP118	Physical education II	G	4	0/0/ 2/2		
	Total:			**38**	38				**Total:**		**38**	38		
2	3 semester							4 semester						
	LNG 1053	General English 1 (A2)	G	6	0/0/ 3/3	no	LNG 1052	LNG 1054	General English 2 (A2)	G	6	0/0/ 3/3	no	LNG 1053
	LNG 1054	General English 2 (A2)					LNG 1053	LNG 1055	Academic English (B1)					LNG 1054

	LNG 1055	Academic English (B1)					LNG 1054		LNG1056	Business English (B2)					LNG 1055
	LNG1 056	Business English (B2)					LNG 1055		LNG 1057	Professional English (B2+)					LNG1056
	LNG 1057	Professional English (B2+)					LNG 1056		2109	ELECTIVE (B2+)					LNG1056
	MAT1 02	Mathematics II	B	6	2/0/ 1/3	no	MAT 101		MAT1 02	Mathematics III	B	6	2/0/ 1/3	no	MAT1 02
	MAT1 03	Mathematics III					MAT 102		MAT1 05	MatLab Ordinary Differential Equations					MAT1 03
	HUM 124	Philosophy	G	6	1/0/ 2/3	S6	нет		CSE17 4	Information and Communication Technology	G	6	2/1/ 0/3	S5	нет
	PHY1 12	Physics III	B	6	1/1/ 1/3	no	PHY S111		HYD13 8	Buildings sanitary	B	6	1/0/ 2/3	P1 -3	CIV12 4
		ELECTIVE					PHY S112		CIV 155	Processes and devices					
	CIV12 4	Engineering systems of buildings and structures	B	6	1/0/ 2/3	P1 -3	SAF 147		CIV	Architecture and building structures	B	6	1/0/ 2/3	P1 -3	CIV10 4
	CIV40 4	Metrology, standardization and certification of building products *			2/0/ 1/3		CIV 114		2211	ELECTIVE	B	6	1/0/ 2/3		
	CIV19 9	Mechanical Engineering I	B	6	1/0/ 2/3		MAT 102								
	Total:			**36**	36				**Total:**			**36**	**36**		
3	**5 semester**								**6 semester**						
	MAT1 05	MatLab Ordinary Differential Equations	B	6	2/0/ 1/3	no	MAT 103		CIV101	BIM technology in construction	P	6	1/0/ 2/3	P1 -3	
	MAT1 06	Partial Differential Equations MatLab					MAT 105		CIV188	Concrete Technology I			2/1/ 0/3		
	CIV19 7	Geotechnology I	B	6	1/1/ 1/3	SE C1 14			HUM1 26	Social-political knowledge	G	8	4/0/ 0/4		
	CIV19 8	Building ceramics I			2/0/ 1/3				3315	ELECTIVE	P	6			
	CIV18 6	Building production technology I	B	6	2/0/ 1/3				3316	ELECTIVE	P	6			
	CIV12 1	Concrete Fillers			1/1/ 1/3				3317	ELECTIVE	P	6			
	3212	ELECTIVE	B	6					3318	ELECTIVE	P	6			
	3213	ELECTIVE	B	6					3319	ELECTIVE	P	6			
	3214	ELECTIVE	B	6											
	Total:			**36**	**36**				**Total:**			**44**	44		
4	**7 trimester**								**8 trimester**						
	4320	ELECTIVE	P	6					4324	ELECTIVE	P	6			
	4321	ELECTIVE	P	6					4325	ELECTIVE	P	6			
	4322	ELECTIVE	P	6					4326	ELECTIVE	P	6			

	4323	ELECTIVE	P	6			
	ECA101	Preparation and writing of the thesis (project)	ИА	4			
	Total:			**28**	24		

ECA101	Preparation and writing of the thesis (project)	ИА	4			
ECA102	Protection of the thesis (project)	ИА	4			
Total:			**26**	18		

Additional types of training				
Year of study	**Code**	**Name of disciplines**	**Credits**	**Semester**
1	AAP122,132	Physical education III, IV (optional)	0	2
1	AAP107	Sports Club Sectional	0	2
1	AAP101	Educational practice	2	2
2	AAP109	Work practice I	2	4
3	AAP103	Work Experience II	4	6
2-3	AAP500	Military training	0	3-6

The number of credits for the entire period of study			
Disciplines cycles	**Credits**		
	mandatory	**additional**	**Total**
The cycle of general education (O)	48	10	58
The cycle of basic disciplines (B)	102	30	132
The cycle of the main disciplines (P)	0	72	72
Total theoretical training:	150	112	262
Extra education	8	**0**	8
Final certification (IA)	14	**0**	14
TOTAL:	22	**0**	22
The classroom volume in theoretical training credits	75	56	131

Descriptors and level of knowledge, skills and competences

A - Knowledge and understanding of:

A1 -bases of architectural design, modern types of constructionstions of buildings and structures;

A2 -Basic physical and mechanical properties of building materials and their manufacturing technology, methods to improve the efficiency of consumptionNia;

A3- methods of engineering surveys in construction;

A4 - basic concepts, laws and methods of engineering mechanics;

A5 - fundamentals of calculation and design of buildings and structures, engineering systems, the selection of the composition of building materials, products and structures;

A6 - technology, organization, mechanization and automation of building production;

A7 - the basis of economic theory, economics, industry, management and marketing, accounting and auditing.

B - Application of knowledge and understanding:

B1 -self-development and launching of various ways to solve professional problems with the use of theoretical and practical knowledge;

B2 -the use of normative and legal documents relating to the professional activity;

B3 -perform calculations of buildings and structures, their bases and foundations, engineering systems, including the use of modern software products;

AT 4 - develop design solutions that meet the requirements of long-term development of the industry, using modern software products;

B5 - analyze production and economic activities of the division and / or the entire enterprise, including using ency-software variables;

AT 6 - to evaluate and monitor the quality of construction and installation work, as well as to carry out acceptance and executed works.

C - Formation of judgment:

C1 -the nature and social significance of their future profession, value disciplines that define a particular area of its activities, its relationship in a holistic system of knowledge;

C2 -of scientific, philosophical and religious paintings of the universe; variety of forms of human knowledge; spiritual values in a creative and everyday life;

C3- about trends in technology of erection of buildings and constructions, production of building materials technology;

D - personal abilities

D1 -the ability to self-organization and self-education;

D2 - the ability to adapt to new situations, the revaluation of accumulated experience, the analysis of its features;

D3 -command of the state language and the language of international communication; lexical and grammatical at least one foreign language;

Competence on completion of training

B - Basic knowledge and skills:

B1 - have a basic knowledge in the field of natural sciences (social, humanitarian, economic) disciplines that contribute to the formation of a highly educated person with a broad outlook and culture of thinking;

B2 - have skills of handling modern technology, be able to use information technologies in the sphere of professional activity;
B3 - be able to analyze and understand the philosophical issues with scientific positions, independently develop cultural wealth, logically and convincingly right to think and to properly build oral and written language;
B4 - be able to express and justify their position on the choice of methods for solving tasks.

P - professional competence, including in accordance with the requirements of the industry professional standards:
P1 - a wide range of theoretical and practical knowledge in the professional field;
P2 - knowledge of modern calculation complex for calculation and design of construction projects in view of earthquake resistance and complex hydrogeological conditions.
P3 - knowledge of modern methods and techniques of construction works using construction equipment in the construction of buildings and structures.

About - human, social and ethical competence:
O1 - to know the social and ethical values based on public opinion, traditions, customs, social norms and navigate to them in their professional activities;
O2 - know the basics of the legal system and the legislation of Kazakhstan; abide by business ethics, own ethical and legal standards of conduct;
O3 - to be able to work in a team, properly to defend his point of view, to offer new solutions; be able to find compromises, to relate their views to the collective opinion: to strive for professional and personal growth;
O4 - to know the trends of social development; to be able to properly navigate the different social situations.

C - Special and managerial competence:
C1-independent management and control of the processes of labor and training activities within the strategies, policies and objectives of the organization, discussion of problems, argumentation conclusions and competent handling of information;
C2 - knowledge of methods of calculation of structures and apply to address specific tasks; the ability to make judgments, evaluation of ideas and formulation of conclusions on specific professional issues;
C3 - the ability to correct choice of design methods of building production and application in practice.

Policy additional education Minor

During the development of at least 12 credits in the disciplines of the program, including the following compulsory subjects (if any):
M1 -
M2 -
M3 -
Assigned additional Minor specialty with the issuance of the Diploma Supplement of the established sample.

Annex to the diploma for standard ECTS

Bachelor of Engineering and Technology, 6 level national qualifications framework with the right management staff to take responsibility for the result at the unit level.

Algebra and beginning of mathematical analysis
CODE - MAT00120
CREDIT - 6 (1/0/2/3)
Prerequisite - a diagnostic test

GOAL AND OBJECTIVES OF THE COURSE

The aim of the course to familiarize students with the basic ideas and concepts of algebra and mathematical analysis and formation basic knowledge necessary to study the course "Mathematics 1".

Course objectives - skills for the study of mathematical disciplines and the effective use of mathematical methods for the solution of research and practical problems in the professional field.

BRIEF DESCRIPTION OF THE COURSE

The course "Introduction to Algebra and Analysis" provides basic concepts of algebra, mathematical analysis, differential and integral calculus.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- basic concepts of algebra;
- the basic concepts of mathematical analysis;
- basic elementary functions;

be able to:

- to find solutions of equations and inequalities, systems of equations and inequalities;
- convert algebraic and trigonometric expressions;
- to solve word problems;
- to find the derivative of elementary functions;
- examine the functions using the derivative;
- to find the indefinite integral of elementary functions;
- to find the definite integral;
- to find the area of a curvilinear trapezoid.

Mathematics I
CODE - MAT00121
CREDIT – 6 (1/0/2/3)
Prerequisite - Elementary mathematics-school course / diagnostic test

GOAL AND OBJECTIVES OF THE COURSE

The main objective of the course is to give the future a certain amount of specialist knowledge on sections of the course "Mathematics-I», required for the related engineering disciplines. Introduce students to the ideas and concepts of mathematical analysis. The main attention is given to the development basic knowledge and skills with a high degree of understanding of the differential and integral calculus.

Objectives of the course:

Acquisition of knowledge necessary for effective use of rapidly developing mathematical methods; obtaining building skills and research of mathematical models; possession of the fundamental parts of mathematics needed to solve research and practical problems in the professional field.

BRIEF DESCRIPTION OF THE COURSE

Current "Mathematics-I» given exposure sections: the introduction into the analysis, differential and integral calculus

Knowledge, skills, skills to complete the course

Study ofsaid discipline will enable students to apply course "Mathematics-I» to solve simple practical problems, to find the tools that are sufficient for their studies and obtain numerical results in some standard situations.

Mathematics II
CODE - MAT00122
CREDIT - 6 (1/0/2/3)
Prerequisite - Mathematics I

GOAL AND OBJECTIVES OF THE COURSE

The objective of teaching the course "Mathematics II» is the formation of bachelors ideas about modern mathematics as a whole as a logically coherent system of theoretical knowledge.

Objectives of the course is to instill students with solid skills in solving mathematical problems with bringing solutions to a practically acceptable result. Develop primary skills of mathematical research applied issues and the ability to independently understand the mathematical apparatus contained in the literature associated with the student's specialty.

BRIEF DESCRIPTION OF THE COURSE

Current "Mathematics-II» given accessible presentation sections: Elements of linear algebra and analytic geometry, differential calculus functions of many variables, multiple integrals. "Mathematics II» is a logical continuation of the course "Mathematics I».

Knowledge, skills, skills to complete the course

Study of said discipline will enable use the acquired theoretical knowledge and skills with a high degree of understanding of their sections of the course, to use them at an appropriate level; translate into mathematical terms simple problems posed in terms of other subject areas; acquire new mathematical knowledge through educational and information technology; solve applied problems in the sphere of professional activity.

Mathematics III
CODE - MAT00123
CREDIT - 6 (1/0/2/3)
Prerequisite - Mathematics I, Mathematics II,

GOAL AND OBJECTIVES OF THE COURSE

The objective of teaching the course "Mathematics-III» is shaping basic knowledge and skills with a high degree of understanding on sections of the course to help you analyze and solve theoretical and practical problems.

Objectives of the course: to impart skills to students to study on their own textbooks, spending probability theory and statistical analysis applications; develop logical thinking and raising the general level of mathematical culture.

BRIEF DESCRIPTION OF THE COURSE

The course "Mathematics-III» includes the following sections: the theory of series, elements of probability theory and mathematical statistics, and is a logical continuation of the subject "Mathematics II».

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- the theory of numerical series;
- the theory of functional series;
- Fourier series;

are elements of the theory of probability and mathematical statistics;

should be able to:

- to solve the problem for all sections of the theory of series;
- to find the probabilities of events;
- to find the numerical characteristics of random variables;
- to use statistical methods for processing experimental data;

Physics I, II
CODE - PHYS111-112
CREDIT - 12 (2/2/2/6)
Prerequisite - a diagnostic test / PHYS110-111

GOAL AND OBJECTIVES OF THE COURSE

The main objective of teaching the PhysicsI and Physics II It is to build notions of modern physical picture of the world and the scientific worldview.

BRIEF DESCRIPTION OF THE COURSE

discipline Physics I and Physics II are the basis of theoretical training and engineering activity of graduates of the higher technical school and represent the core of the physical knowledge needed an engineer to the current laws of the physical world. The course "Physics 1" includes the following sections: physical foundations of mechanics, structure of matter and thermodynamics, electrostatics and electrodynamics. Discipline "Physics II"It is a logical continuation of the discipline" Physics 1 ", and generates a holistic view of the course of general physics as one of the basic components of the general theoretical training bachelors of engineering profile. Discipline "Physics II» includes the following sections: magnetism, optika, nanostructures, basics of quantum physics, atomic and nuclear physics.

Knowledge, skills, skills to complete the course

- the ability to use the knowledge of the fundamental laws, theories of classical and modern physics, as well as the use of physical research as the basis for a system of professional activity.

The modern history of Kazakhstan
CODE - HUM113
CREDIT - 6 (1/0/2/3)
Prerequisite - no

GOAL AND OBJECTIVES OF THE COURSE

The aim of the course is to introduce engineering students to the basic theoretical and practical achievements of Soviet historical scholarship on the history of modern Kazakhstan, by the complex and systematic study of the basic stages of formation and development of Kazakhstan's society.

- analyze the peculiarities and contradictions of the history of Kazakhstan in the Soviet period;
- to reveal the contents of the historical foundations of political laws, socio-economic and cultural processes in the stages of formation of an independent state;
- promote the formation of a civic stand of students;
- to educate students in the spirit of patriotism and tolerance, of belonging to his people, the Fatherland;

BRIEF DESCRIPTION OF THE COURSE

The course of modern history of Kazakhstan is an independent discipline, and covers the period from the beginning of the twentieth century to the present day. The modern history of Kazakhstan is studying the national liberation movement of the Kazakh intelligentsia at the beginning of the XX century, during the creation of the Kazakh SSR, as well as the process of establishing a multi-ethnic society.

Knowledge, skills, skills to complete the course

- knowledge of the events, facts and phenomena of the contemporary history of Kazakhstan;
- knowledge of the history of the ethnic groups living in Kazakhstan;
- knowledge of the basic stages of formation of Kazakh statehood;
- ability to analyze complex historical events and to predict their further development;
- ability to work with all kinds of historical sources;
- ability to write essays and research papers on the history of the Fatherland;
- the ability to handle historical concepts;
- the ability to lead the discussion;
- skills of independent analysis of the historical facts, events and phenomena;
- the skills of public speaking.

Kazakh / Russian language
CODE -
CREDIT - 8 (0/0/4/4)
Prerequisite - a diagnostic test

GOAL AND OBJECTIVES OF THE COURSE

- to teach students to have hearing statements on familiar topics related to home, school, leisure centers;
- understand texts in personal and professional topics, containing the most frequent words and expressions;
- be able to carry on a conversation on everyday topics; describe their experiences; tell your opinion; recount and evaluate the content of reading the book, seen the movie;
- be able to create simple texts on familiar topics, including those related to professional activities.

BRIEF DESCRIPTION OF THE COURSE

Language course material is selected in such a way that the student, learning lexical and grammar at least had the opportunity to get acquainted with the typical communication situations, and he found himself in such situations, able to correctly evaluate them and select the appropriate model (strategy) of verbal behavior.

The main focus of training at the same time is transferred from the transfer of knowledge on learning to use the language being studied in the implementation of different types of speech activity, which is the reading of (subject to reading comprehension), listening (with the same proviso) and the production of a certain complexity of the text with a certain degree of grammatical and lexical correctness.

The material selected for the training so that students studying Kazakh / Russian language, acquired skills in reading, writing and understanding of oral speech on the basis of the simultaneous development of the basics of grammar (fonetikai, morphology and syntax) and the use of words in the continuous multiple repetition with the increasing complexity of buildings.

Knowledge, skills, skills to complete the course

The student with the active organization of work in the classroom and good homework by the end of the first semester, acquires skills, appropriate European level A2 (Threshold of ALTE classification), that is, is on the verge of self-level proficiency.

English
CODE - LNG1051-1057
CREDIT - 24 (0/0/12/12)
Prerequisite - a diagnostic test / LNG1051-1056

LNG1051
GOAL AND OBJECTIVES OF THE COURSE

Discipline in the English language "Beginner English" is designed primarily for learning from scratch. This course is suitable also for those who have only a general basic knowledge of the language. After passing this level, the student will be able to confidently communicate in basic topics in English, learn the basics of grammar and lay a certain foundation that will improve their skills to the next stage of learning English.
Postrekvizity Course: Elementary English.

LNG1052
GOAL AND OBJECTIVES OF THE COURSE

Discipline "Elementary English" - is the foundation of learning English, which focuses on the development of receptive students skills (reading and listening) and productive skills (writing and speaking), the analysis of the basic knowledge, use and storage of the main rules of grammar and mastering the features of pronunciation and basic vocabulary as well as promoting independent learning and critical thinking.
Prerequisite courses: Beginner.
Postrekvizity course: General 1.

LNG1053
GOAL AND OBJECTIVES OF THE COURSE

The aim of the course "General English 1" - to provide students with the opportunity to obtain sufficient knowledge to become more fluent in everyday social and academic settings. Students work on improving pronunciation, vocabulary and grammar. At this level, the main challenge will be to reinforce the skills obtained earlier, to learn how to prepare and properly apply complex syntactic structures in English, as well as to achieve a really good pronunciation.
Prerequisites Course: Elementary English.
Postrekvizity course: General 2.

LNG1054
GOAL AND OBJECTIVES OF THE COURSE

The course "General English 2" is designed for students who continue to study the "General English 1". The course is focused on the ability to actively use in practice most aspects of the English language, conditional sentences, phrases in the passive voice, etc. At this stage, the student will be able to maintain a conversation with several people or to express their views. Student greatly expands their vocabulary, allowing it to freely express their thoughts in any situation. At the same time it filled up with various synonyms and antonyms of familiar words, phrasal verbs and fixed expressions.
Prerequisites course: General 1.
Postrekvizity course: Academic English.
LNG1055
GOAL AND OBJECTIVES OF THE COURSE

The main objective of the course of English "Academic English" is to develop the academic language skills. Discipline is a language style that is used when writing academic papers (paragraph

abstract, essay, presentation, etc.). This course is designed to help students become more successful and effective in their teaching, developing critical thinking skills and independent learning.
Prerequisites course: General 2.
Postrekvizity course: Professional English.

LNG1056
GOAL AND OBJECTIVES OF THE COURSE

"Business English" (Business English) - it is English for business communication, business and career. Knowledge of business English is useful for negotiations and business correspondence, preparation of presentations and informal communication with business partners.
preparation features are that it is necessary not only to master the vocabulary, but also to learn new skills: presentation, communication, language, professional.
Prerequisites course: IELTS score 5.0, and / or Academic English
Postrekvizity course: Professional English, IELTS score 5.5-6.0

LNG1057
GOAL AND OBJECTIVES OF THE COURSE

"Professional English" course is designed for students of level B2 +, which aims - to increase the language competence of students in their respective professional fields. The main objective of the course is to teach students to work with texts, both audio and written, in the specialty. The curriculum is based on the necessary vocabulary (words and terms), often used in the English language for specific purposes. Students acquire professional English language skills through integrated education on the basis of content and language, possess the vocabulary to read and understand the original sources with a high degree of independence, and to practice different communication patterns and vocabulary in specific professional situations.
Prerequisites course: Business English.
Postrekvizity course: any elective course.

Information and communication technologies (in English)
CODE -
CREDIT - 6 (2/1/0/3)
Prerequisite - no

GOAL AND OBJECTIVES OF THE COURSE

Training in the use of modern information technologies in the field by professional activities. The objectives of the course include:

- Expand the basic concepts of the architecture of computer systems;
- Expand the basic concepts of information and communication technologies and the subject terminology;
- Learn to work with the software interfaces of operating systems;
- learn to work with the data in a different view, as a table structured and unstructured;
- learn how to apply the basic principles of information security;
- Expand the concept of data formats and multimedia content. Learn to work with standard media processing applications data. Use modern approaches presentation material;
- Expand the concept of modern social, cloud and e-mail platforms and ways to work with them;
- Train the use of algorithms and programming techniques to solve business process automation tasks.

BRIEF DESCRIPTION OF THE COURSE

The course includes a training program aimed at leveling the basic knowledge of students in the field of information and communication technologies. It contains full-time, according to the model curriculum SES, with a predominance of training of practical skills of working with data, algorithms and programming. The course is structured in such a way that would teach students not only basic concepts of architecture and modern infrastructure of information and communication technologies, but also to learn to use these tools to solve applied problems. Learn how to optimize processes, to apply adequate models and methods for solving practical problems with the use of modern methods and information technology tools to automate routine processes to be more productive and efficient.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- Software Packages;
- The architecture of computer systems;
- the infrastructure of information and communication technologies;
- The interfaces of modern operating systems;
- Advanced tools for working with data of different nature and purpose;
- Types of information security threats, principles, tools and methods for data protection;
- Python programming language.

be able to:

- Work with interfaces of modern operating systems;
- To work with modern software application for data of different nature and purpose;
- Apply contemporary social, cloud, email platform for the organization of business processes;
- Programming on algorithmic programming language;
- To analyze, simulate, design, implement, test and evaluate the system of information and communication technologies.

Philosophy
CODE - 124
CREDIT - 6 (1/0/2/3)
Prerequisite - Modern History of Kazakhstan

GOAL AND OBJECTIVES OF THE COURSE

The course is focused cognitive, operational, communication, self-educational competence to solve problems:

- contribute to the development of adequate philosophical orientation in the contemporary world;
- to form a creative and critical thinking in students;
- to distinguish between the ratio of the spiritual and material values, their role in human life, society and civilization;
- assist in determining their attitude to life and the search for harmony with the environment.

BRIEF DESCRIPTION OF THE COURSE

"Philosophy" is the formation of a holistic world view that has developed in the context of the socio-historical and cultural development of mankind. Familiarity with the basic paradigms of the methodology of teaching philosophy and education in classical and post-classical traditions of philosophy. Philosophy aims to develop a sustainable life guidance, finding the meaning of their existence as a special form of spiritual production. It promotes the formation of moral character of the person with the ability of critical and creative thinking. Theoretical sources of this course is the concept of Western, Russian, Kazakh scientists on the history and theory of philosophy.

Knowledge, skills, skills to complete the course

- knowledge of basic terms, the main concepts and problems of philosophy;
- knowledge of basic philosophical ways of solving philosophical problems in the context of culture;
- the ability to analyze the history of philosophical thought;
- ability to identify alternative ways of formulating and solving philosophical problems in the history of mankind;
- the ability to identify the main theoretical approaches to the relationship between man and society;
- the ability to master techniques for performing independent work;
- search skills systematization of the material;
- skills to freely discuss and make rational decisions;
- skills ethical principles in professional activities.

Ordinary Differential Equations
CODE - MAT00124
CREDIT - 6 (1/0/2/3)
Prerequisite - Mathematics I-III

GOAL AND OBJECTIVES OF THE COURSE

The objective of teaching the course "Ordinary differential equations. Matlab »is the formation of basic knowledge on sections of the course to help you analyze, model and solve theoretical and practical tasks such as analytical and numerical methods using Matlab; impart skills to students to study on their own textbooks.

Objectives of the course learn to recognize the types and forms of integrable equations and systems, their integration and use differential equations to solve mathematical applications.

BRIEF DESCRIPTION OF THE COURSE

Ordinary differential equations of the 1st order. Ordinary differential equations of higher orders. System of differential equations. Linear equations with variable coefficients. Numerical integration of differential equations and systems. Using Matlab for numerical solutions of differential equations.

Knowledge, skills, skills to complete the course

- master the methods of solution of ordinary differential equations;
- to put mathematical problems;
- be able to construct mathematical models;
- be able to solve problems modeled by differential equations as an analytical and numerical methods using Matlab.

Partial differential equations
CODE - MAT00125
CREDIT - 6 (1/0/2/3)
Prerequisite - Mathematics I-III

GOAL AND OBJECTIVES OF THE COURSE

The objective of teaching the course "Differential equations in partial derivatives. Matlab. »Is formation of basic knowledge on sections of the course to help you analyze, model and solve theoretical and practical problems.

Course Objectives: to apply the theory of partial differential equations to solve and research applications from various fields of natural sciences, economics, medicine, biology and ecology; generate ideas about the implementation of the numerical methods for solving boundary value problems using Matlab

BRIEF DESCRIPTION OF THE COURSE

The basic equations of mathematical physics. Classical boundary value problems for partial differential equations. Analytical and numerical methods for solving the classical boundary value problems. Using Matlab for numerical solution of boundary value problems.

Knowledge, skills, skills to complete the course

- According to the master mathematical tools to help you analyze, model and solve the classical boundary value problems;
- to master the techniques of classical solutions of boundary value problems;
-umet put the problem to choose the methods of solving, in analytical form, and with the use of computer technology;
- use of modern software package obespecheniem- Matlab;
- to master the methodology and skills of numerical implementation of mathematical models, analysis of the results, interpreting them to refine the model;
- independently to expand their knowledge of mathematics.

Engineering and computer graphics
CODE - GEN101
CREDIT - 6 (1/0/2/3)
Prerequisite - no

GOAL AND OBJECTIVES OF THE COURSE

- the development of spatial representation and imagination, constructive-geometric thinking, capacity for analysis and synthesis of spatial forms and relations on the basis of graphic space models;
- training students to work with different in appearance and content of the image information, based on the graphic representation of information, methods of graphic modeling of geometric objects, the rules of design and construction documentation design, graphic models of phenomena and processes;
- development of methods and means of computer graphics students acquire knowledge and skills to work with a system of computer-aided design AutoCAD.

BRIEF DESCRIPTION OF THE COURSE

Studying ways to get certain graphic models of space, based on the orthogonal projection and the ability to solve the problem on these models, related forms and spatial relationships. Mastering the basic principles and methods of geometric modeling and methodologies for the development of graphical applications. Acquisition of knowledge of construction drawing, the ability to read and compose graphical and textual design documentation in accordance with the requirements of normative documents, state standards. Introducing students to the concept of computer graphics, geometric modeling, graphics, modern interactive graphic systems for automation tasks of drawing and graphic works on AutoCAD example.

Formation of skills in the use of universal graphic systems for the development and editing of drawings by using three-dimensional computer simulation, design automation for the development and implementation of the design documentation.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- theoretical fundamentals of complex and axonometric drawings;
- methods of imaging - species profiles, cross sections - both existing and newly developed products;
- rules for the implementation and design drawings, preparation of design and text documents, set of guests;
- types of compounds parts products, their conditional images and symbols;
- methods for constructing sweep surfaces.

be able to:

- to build complex and axonometric drawing of geometric forms;
- perform text and graphic design documentation;
- read and execute an assembly drawing working drawings and sketches in accordance with the GOST;
- to freely navigate in projections with numerical marks;
- to work in the AutoCAD environment as a universal species with 2M, 3M and with objects.

have the skills to:

- performing and reading assembly drawing;
- building a three-dimensional space of flat projection models;
- solving positional and metric problems;

- possession of modern means of computer-aided design.

possess the following competencies:

- ability to apply the methods of graphical representation of objects of professional activity, for example, engineering objects, circuits and systems;
- willingness to use information technologies, including modern means of computer graphics in their subject area;
- willingness to participate in the development of design and working design documentation in accordance with the standards, technical conditions and other normative documents.

General chemistry
CODE - CHE192
CREDIT - 6 (2/1/0/3)
Prerequisite - a diagnostic test

GOAL AND OBJECTIVES OF THE COURSE

Course objective: Formation of knowledge on the fundamental issues of general chemistry and skills they use in professional activities.

Course Objective:

- convey the basic theoretical knowledge of the course of chemistry;
- to help students get laboratory work skills;
- learn how to solve common tasks, and to paint the reactions;

which promotes absorption of informal theoretical material;

- form a chemical thinking skills in students.

BRIEF DESCRIPTION OF THE COURSE

The course "General Chemistry" examines laws, theoretical propositions and conclusions which underlie all chemical disciplines, studies the properties and relationships of chemical elements, based on the periodic law of DI Mendeleev and the current understanding of the structure of matter, fundamentals of chemical thermodynamics and kinetics , processes in solutions, the structure of complex compounds.

Knowledge, skills, skills to complete the course

As a result of the development of the discipline the student should know:

- basic chemical laws and concepts,
- various chemical systems,
- the basic laws of chemical reactions,
- reactivity of the substances on the basis of knowledge about the structure of atoms of the periodic system of elements and chemical bonds.

be able to:

- solve problems, using the knowledge acquired,
- paint the reaction equations,
- to make calculations using the basic chemical laws.

be skilled in:

- navigate the basic notions of chemistry, the properties of metals and nonmetallic elements-groups of the periodic system;
- acquire skills of drawing up the chemical equations, solve problems, explain the properties of elements and their compounds on the basis of the laws of chemistry, to conduct chemical experiments and explain the phenomena occurring.

Social-political knowledge
CODE – HUM130
CREDIT -8 (4/0/0/4)
Prerequisite -

This course involves the study of four scientific disciplines - psychology, political science, sociology and cultural studies, each of which has its subject, terminology and research methods.

Interactions between these scientific disciplines are carried out based on the principles of information complementarity; integrability; methodological integrity of research approaches of these disciplines; generality of result-oriented teaching methodology; unified system representation of the typology of learning outcomes as formed abilities.

The theoretical sources of this course are the concepts of Western, Russian, and Kazakh scientists in the field of sociology, political science, and cultural studies.

Building Materials
CODE - CIV114
CREDIT - 6 (1/1/1/3)
Prerequisite -Fizika I, II, Chemistry

GOAL AND OBJECTIVES OF THE COURSE

purpose of teachingdiscipline "Building materials" as one of the first engineering disciplines is to prepare a specialist who knows the fundamentals of materials science of building materials with the desired properties; questions of durability of materials; their role is to provide the highest quality of operational, environmental cleanliness, efficiency and aesthetics.

The main task of studying this discipline is understanding of the industry's leading position in the production of key building materials and products: the rational use of raw materials in an environmentally sound, cost of fuel and energy and other material resources in the production of building materials and products, appropriate to the purpose.

BRIEF DESCRIPTION OF THE COURSE

"Building materials" - one of the main subjects for the builders of all trades. All buildings and structures are erected from building materials, so the right of choice, the ability to assess their quality and state of preservation, as well as to ensure normal operating conditions of structures made of these materials - all you need to know the students of our specialty.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- range of building materials and their properties;
- features of their structure, raw materials;
- the essence of the operation and processes of processing of raw materials;
- technology production of various building materials, costs, etc.

be able to:

- Literacy is defined characteristics of building materials;
- support the choice of materials and products in the design solutions for the given conditions of operation;
- High quality materials;
- to predict the reliability and durability of the materials in the construction;
- determine the economic efficiency of the production and use of building materials and products;
- to carry out the production control;
- to evaluate the properties of building materials and products amounts and well-versed in teaching the principles of their determination.

own:

- material science basics of obtaining building materials with the desired properties.

Engineering Mechanics I
CODE - CIV199
CREDIT - 6 (1/0/2/3)
Prerequisite - Physics I, II. Mathematics I, II.

GOAL AND OBJECTIVES OF THE COURSE

Preparation students theoretical knowledge about the forces and the conditions of equilibrium of material bodies, under the action of the forces of elastic bodies study deformation under external forces and elementary calculations on strength, rigidity and stability kostruktsii elements.

BRIEF DESCRIPTION OF THE COURSE

Mechanical Engineering introduce to a complex discipline that covers such currently distsipliy both theoretical mechanics, soprotivleie matertalov and building mechanics. Engineering Mechanics I, consisting of the sections "Theoretical mehaika" and "Strength of Materials" includes vperechen cycle basing disciplines (DB), the mastery of which defines qualifications and academic Bachelor construction. In the "Theoretical Mechanics" rassmatrivayutya main provisions of statics. In "Soprotivleie materials" are considered in this section of the strength and stiffness of statically determinate systems tensile, compressive, geometric harateristiki, shear, bending of straight bars, resistance elements onto structures. The task of the discipline is to apply the theoretical knowledge to the solution of practical problems,

Knowledge, skills, skills to complete the course
As a result of the development of the discipline the student should know:

- Fundamentals of statics;
- the basic methods and principles for calculating the elements of strength and rigidity of the structures, as well as recommendations for the rational design of engineering structures.

be able to:

- knowing the basic aktsiomy statics and equilibrium conditions obtained for rigid bodies, how to apply them to small deformable, and any variable bodies;
- perform calculations on the strength, rigidity and stability in kostruktsii elements for the simplest type strain (tension - compression statically indeterminate, shear, bending).

have the skills to:

- solving applied problems: - to implement three types of strength calculation; - determining the estimated load verification, project; - for the stiffness calculation.

Engineering and computer graphics (AutoCaD)
CODE - CIV
CREDIT - 6 (1/0/2/3)
Prerequisite - Physics I, II. Mathematics I, II.

GOAL AND OBJECTIVES OF THE COURSE

Students with skills to build graphical models of engineering areas: drawings, spatial models, visual images, diagrams, etc. In engineering, engineering drawing objects are nodes and details of trucks, construction - buildings and structures.

BRIEF DESCRIPTION OF THE COURSE

Discipline "Engineering and computer graphics (AutoCaD)» is the basic discipline and includes the theoretical foundations of descriptive geometry and graphics of AutoCAD, the study of which is necessary for the design of engineering structures, processes and their graphic display.

Knowledge, skills, skills to complete the course
As a result of the development of the discipline the student should know:

- rules for the implementation and design of construction drawings;
- the standards of the Unified system of design documentation (ESKD) and Systems project documentation for construction (ASAP) to the design and preparation of drawings;
- methods of 2d and 3d of building drawings and perspective images;
- methods for solving in the drawing and 3d models of engineering and geometrical problems arising in the building design;

be able to:

- to analyze the spatial shape of objects by their images on the construction drawings;
- to carry out drawings and other design documents, in relation to building design;
- apply the regulations and national standards required to design drawings and other design documentation;
- use computer technology for a drawing object;
- photorealistic 3d build computer models of buildings, typical of parts and components;
- to be able to build long-term projections;
- independently use educational and reference books;

own:

- skills for making drawings of 2d and 3d technologies;
- skills to design the project and working documentation in accordance with ESKD and ASAP.

Water intake facilities and pumping stations
CODE - HYD107
CREDIT - 6 (1/0/2/3)
Prerequisite - Waterworks, Hydraulics, Transportation water.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching is to form a body of knowledge and to prepare them for independent work in the field of water intake facilities.

BRIEF DESCRIPTION OF THE COURSE
The course "Water intake facilities and pumping stations" gives an idea of the role and place of intake structures, choosing their location, type and design of intake structures, features facilities for the specific conditions, as well as considering the classification of pumps and pumping stations, the basic theory, characteristics, methods of regulation and pump designs.

Knowledge, skills, skills to complete the course
The course "Water intake facilities and pumping stations" gives the knowledge of students about current water issues in Kazakhstan, state and prospects of the water intake in the Republic of Kazakhstan, on the types and designs of water intake structures and principles of their choice and provides a comprehensive training of future specialists.

On completion of the course the student will receive:

- Knowledge of the role and place of intake structures in the general water supply system;
- Knowledge of the basis of calculation of water intake facilities.
- Knowledge of general information and classification of the pumping station;
- The ability to choose the location of water intake facilities;
- The ability to choose the type of water intake;
- Skills define the basic parameters for the water intake structures
- Ability to determine the necessary water pressure for lifting and feeding pump;
- Skills using reference literature hold selection pump;
- Possession of free readings of measuring instruments used in pump installations.

Pumps and fans
CODE - HYD136
CREDIT - 6 (1/1/1/3)
Prerequisite - Mathematics, physics, hydraulics.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching is to acquire the students theoretical knowledge and practical skills in pumps and fans used in the system of water supply and sanitation.

BRIEF DESCRIPTION OF THE COURSE
General information on pumps, pumping units and fans. The operating parameters and characteristics of the construction and operation of positive displacement pumps, process parameters. Test centrifugal pump and fan their construction characteristics. Water and heat pumping station. Fans, compressors and their general information and classification.

Knowledge, skills, skills to complete the course
As a result of studying the discipline, students should:

- **know -** konstruktirovaniya foundations of design and operation of pumping units, fans and blowers station.
- **To be able to -** to put into practice the theoretical knowledge and skills; use the method of calculation to determine the process parameters and the order of the blowers in a production environment.

The pumps and pump stations
CODE - HYD137
CREDIT - 6 (1/0/2/3)
Prerequisite - Theoretical mechanics, descriptive geometry and engineering graphics, mathematics, physics, hydraulics.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of discipline - to acquaint the future specialist with such concepts as "pump", "pump unit" and "pumping station"; make a review of the current pumping equipment; learn the basic parameters and classification of centrifugal pumps; consider in detail the theory of centrifugal pumps; consider the circuit units and structures of the main pumping station facilities; pay attention to the study of structures of different types of pump stations buildings.

BRIEF DESCRIPTION OF THE COURSE
General information on pumps, pumping units and fans. The operating parameters and characteristics of the construction and operation of positive displacement pumps, process parameters. Test centrifugal pump and fan their construction characteristics. Water and heat pumping station. Fans, compressors and their general information and classification.

Knowledge, skills, skills to complete the course
After studying the discipline "Pumps and pumping stations," a student must:
Know
- General information and classification of pumps and pumping stations;
- basic kinds and types of pumps and pumping systems, the purpose of their main components and parts;
- parameters and characteristics of the pumps;
- conditions of use of pumps and methods for their selection;
- rules of operation of pumping units.

be able to
- read and understand the drawings pumps and pumping station;
- experimental by getting their basic parameters and characteristics;
- determining a need to raise the water pressure and the pump flow;
- using reference literature hold selection pump;
- evaluate the effectiveness of its work.

Own
- skills proper startup of the pump unit,
- control modes of the pumps,

free readings of measuring instruments used in the pumping plants

Architecture of civil and industrial buildings
CODE - CIV183
CREDIT - 6 (2/0/1/3)
prerequisite - Architecture

GOAL AND OBJECTIVES OF THE COURSE

The purpose of discipline is:

The course includes the study of the foundations of their architectural design, ie principles of space-planning structure of the buildings, their appearance and internal appearance closely with the design solution.

It covers all kinds of designs of civil buildings, their classification, scope, principles of constructions in the construction of their role in the formation of body-and the architectural design of buildings and common technical and economic characteristics.

Tasks of the discipline

Inculcate skills develop design solutions for civil and industrial buildings as a whole, consisting of linked supporting and enclosing structures. To familiarize students with the characteristics of modern bearing and protecting designs, with modern methods of space-planning decisions, including for the construction of special climatic conditions.

BRIEF DESCRIPTION OF THE COURSE

It outlines the basics of architectural design; an overview of the buildings and structures; information about the size of modular coordination in building; the main structural elements of buildings; physical and technical fundamentals of architectural design; urban development framework; space-planning and designs of residential, public and industrial buildings and facilities. The construction of the underground part of the elements of civil buildings. Construction of bearing elements and low-rise public buildings. Construction of buildings enclosing elements. Construction elements finishes. General information on industrial buildings. Carrying and protecting designs of industrial buildings. Planning, construction and landscaping companies. Reconstruction of industrial buildings.

Knowledge, skills, skills to complete the course

As a result of the development of the discipline the student should know:

– basic methods and techniques of development of space-planning and designs of civil buildings, taking into account the laws of physics, mechanics, aesthetics and economy;

– ways to improve the space-planning and design solutions prefabrication of civil and industrial buildings, taking into account the further unification of provisioning, typing and standardization of building elements.

be able to:

– identify the relationship between the adopted structures and impacts on the building, the operating conditions of buildings and elements;

– make architectural and construction projects sections of buildings and structures under the guidance of experts: architects and engineers;

– implement design solutions for buildings and their separate elements in nature in compliance with the rules of decoration, with the use of conventional and decorative materials to improve the quality of construction work, the input operation of buildings;

– technically correct to use reasonable methods of structural design of the building, respectively, taken space planning and artistic solution;

have the skills:

- Reading and images of architectural and structural drawings.

Engineering Mechanics II
CODE - CIV123
CREDIT - 6 (1/0/2/3)
prerequisite - Physics I, Mathematics I, Mathematics II, Engineering Mechanics.

GOAL AND OBJECTIVES OF THE COURSE

Mechanical Engineering is a complex discipline covering currently such disciplines as theoretical mechanics, strength of materials and structural mechanics. The purpose of teaching "Engineering Mechanics II» are: students with theoretical knowledge about the geometrical properties of the motion of bodies irrespective of their inertia and the forces acting on the laws of physical motion of bodies taking into account the inertia under the forces to study the deformation of elastic bodies under the influence of external forces and elementary calculations; strength, stiffness and stability of construction elements and structures. Discipline "Engineering Mechanics II» implies carrying out lectures and practical classes, independent work of students and the implementation of semester work.

BRIEF DESCRIPTION OF THE COURSE

Learning calculation methods of different structures on the strength, stiffness and stability; mastering the basic universal analytical methods of analysis of structures under static and dynamic influence; develop students' logical thinking, skills of independent thinking through, the need for further work in solving various problems technique. Kinematic analysis of structures, calculation of flat frames, flat forms, determining the displacement of elastic systems, the calculation of statically indeterminate frame by displacement method.

Knowledge, skills, skills to complete the course
As a result of the development of the discipline the student should know:

- ways of specifying movement points;
- the laws of dynamics, problems of dynamics, basic concepts and definitions;
- the basic methods and principles for calculating the elements of strength and rigidity of the structures, as well as recommendations for the rational design of engineering structures.

be able to:

- knowing the law of motion of the body (or dots) identify all the kinematic quantities characterizing as body movement in general, and the motion of each of its points separately (trajectory, velocity, acceleration, etc.); • apply the basic laws and the dynamics of the theorem to solve practical engineering problems; • perform calculations on the strength and stiffness of structural elements for the simplest type of deformation (tensile - compressive statically indeterminate systems, torsion), complex deformations (oblique bending, eccentric compression).

have the skills to:

- applications;
- Implementation of three kinds of strength calculation: verification, for determining the estimated load, project;
- for the stiffness calculation.

Concrete Structures I
CODE - CIV117
CREDIT - 6 (2/0/1/3)
prerequisite - Architecture, Architecture of industrial buildings, Engineering Mechanics.

GOAL AND OBJECTIVES OF THE COURSE

student acquaintance with the basic building structures of reinforced concrete. Competent calculation loads. Basic principles of the calculation of bearing and enclosing structures made of reinforced concrete. Proper design of the main load-bearing structures of buildings and structures.

The development of students' desire to improve the outlook for the design and application issues in the construction sector of the engineering equipment in accordance with modern energy-saving technologies, skills to ensure safety in the area of professional activity.

BRIEF DESCRIPTION OF THE COURSE

Discipline "Reinforced Concrete Structures I» requires students to master the basic provisions concerning the use of reinforced concrete in the construction of buildings and structures. The course includes the following sections:

- the theory of reinforced concrete structures;
- calculation of reinforced concrete structures in bending and compression;
- the types of soils and foundations;
- stone and reinforced concrete structures of multi-storey buildings;
- reinforced concrete construction of industrial buildings.

Knowledge, skills, skills to complete the course
As a result of the development of the discipline the student should know:

- the basic design scheme of buildings and structures, the range of the main bearing and enclosing structures. Basic principles of calculation bent elements at normal and oblique sections.

be able to:

- correctly calculate the load count and bendable design and compressed concrete elements;
- graphically draw up working papers on structures and buildings.

own:

- calculation of the basic principles and bent struts;
- the necessary skills for the analysis and design of load-bearing structures of buildings and structures.

Processes aerodynamics
CODE - HYD177
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, engineering systems, hydraulics and aerodynamics, heat and mass transfer.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "process aerodynamics" yavlyaetsyapriobretenie students theoretical knowledge and practical skills required dlyaponimaniya processes and phenomena associated with heat production for nuzhdkommunalno domestic and process consumers, rational and effektivnymispolzovaniem fuel and energy resources on the basis of modern tehnicheskihresheny and taking into account the prospects of development thermal generation plants and their components.

BRIEF DESCRIPTION OF THE COURSE
Discipline "Processes aerodynamics" gives an idea about the properties and characteristics of the energy fuels, the processes of combustion, methods of burning fuels, the device and the principle of operation of main and auxiliary heat generating equipment units.

Knowledge, skills, skills to complete the course
The student should know:
- basic information about the origin, classification, composition and properties of fuels;
- Modern methods and means of thermal energy;
- Theoretical bases of processes of burning fossil fuels;
- modern methods of calculation of heat generating plants;
- schemes and designs TSU and their basic elements;
- aqueous TSU mode;
- TSU and thermal circuit technique of calculation;
- fuel economy and system shlakozoloudaleniya TSU;
- TSU basics of design.

In addition, the student must be able to:
- select and validate the input data for calculation and design of the TSU;
- design and technological schemes rely heat production, heat-generating equipment and its components;
- develop arrangements for fuel and heat savings for emissions reduction.

Water quality
CODE - HYD129
CREDIT - 6 (1/0/2/3)
Prerequisite - chemistry, physics, the list of previous subjects in the curriculum specialization.

GOAL AND OBJECTIVES OF THE COURSE
"Water quality" to give students knowledge about the formation and composition of the main characteristics of natural and waste water, the theoretical foundations of chemical, physico-chemical and biochemical methods of water purification.

BRIEF DESCRIPTION OF THE COURSE
The course "Water quality" consists of two parts. The first of these covers issues related to water chemistry in which aqueous bases are theoretical chemistry, the chemical composition of natural and waste water, and their assessment, physicochemical principles water treatment processes. It emphasizes the commonality of a number of methods used for the processing, both natural and waste waters. The second part of the course covers issues of general microbiology and, based on the essence of biochemical processes occurring in the soil, natural bodies of water and on plants natural and waste waters.

Knowledge, skills, skills to complete the course
As a result of studying the course, students should know:
- physical, chemical and biological indicators of water quality, the theoretical basis of upholding the processes of coagulation, sorption, etc.,
- the main representatives of the microcosm, inhabiting the water bodies,
- basics of sanitary-bacteriological status of water bodies.

Basic skills:
As a result of studying the course, students should know:
- methodological fundamental basics of water chemistry and microbiology;
- the notion of systems and processes involved in the formation of water bodies;
- skills to work in a chemical laboratory, to be able to perform physico-chemical sanitary and bacteriological control of water quality;
- ability to apply the acquired skills and knowledge in practice in the treatment plants.

Metal structures I
CODE -**CIV134**
CREDIT - 6 (2/0/1/3)
prerequisite -

GOAL AND OBJECTIVES OF THE COURSE

The aim of the development of the discipline "Metal Constructions I» is the formation of students' knowledge and competencies in the design and use of metal structures in construction practice, the deepening of the existing general technical knowledge in the specialty and specialist training for technical and production, design and research. "Metal Constructions I», are deepening the knowledge previously acquired and skills in the design and application of steel and aluminum structures in construction practice.

Objectives of the course - to form students' theoretical knowledge, skills and competence in the solution of contemporary problems in the design of steel and aluminum structures, in particular:

- by applying the basic concepts, methods and calculation methods of modern steel and aluminum structures;
- through the use of theory and practice of modern approaches and trends in the calculation and design of steel and aluminum structures.

BRIEF DESCRIPTION OF THE COURSE

Discipline "Metal Constructions I» requires students to master the basic provisions relating to the use of steel and aluminum alloys in structures of buildings and structures. The course is divided into five sections:

- steels and aluminum in the construction;
- method of calculation of metal structures limit state;
- Connection of metal structures;
- metal beams, beam cell columns, metal girders;
- skeletons of industrial buildings.

Knowledge, skills, skills to complete the course

As a result of the development of the discipline the student should know:

- progressive metal structures of buildings and structures, carried out in recent research in the theory of steel and aluminum alloys, kreticheski analyze and evaluate the latest scientific achievements, to generate new ideas for solving the research and practical problems, including interdisciplinary areas.

be able to:

- to plan and solve problems of their own professional and personal development, to project elements of steel and alloys albyuminievyh minimum estimated cost design engineering structures of steel and aluminum alloy, constructed and operated under special conditions.

have the skills to:

- the ability to design and implement integrated research, modern techniques and methods of calculation and design of steel structures.

Heat transfer in the fence
CODE - HYD178
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, heat transfer, heat and mass transfer.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "Heat transfer in the fence" is to acquire the students theoretical knowledge and practical skills in the application of thermodynamic methods of analysis, knowledge of the laws of heat and mass transfer, as in the study of special subjects and to solve specific problems in engineering practice.

BRIEF DESCRIPTION OF THE COURSE
"Heat transfer in the fence" - discipline, which occupies a central place in the preparation of bachelors on specialty "Heat and ventilation". This is because the receiving process, conversion and use of heat transfer occur in nearly all devices, heat and ventilation systems.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- The thermodynamic properties of substances are used as working fluids;
- principles of heat-equipment and ways to improve the efficiency of its work;
- Methods of Analysis of energy conversion efficiency;
- the physical nature of heat and mass transfer;
- methods of calculation **and methods for heat transfer enhancement.**

In addition, the student must be able to:

- determine parameters of the working fluid;
- analyze processes change the operating state of the body using the laws of thermodynamics;
- calculate the heat exchangers;
- develop arrangements for effective change (increase or decrease) the heat flows.

Complex use of water
CODE - HYD130
CREDIT - 6 (1/0/2/3)
Prerequisite - Informatics, Chemistry, Water Cadastre, Hydrology and flow regulation, Geoecology, Hydroecology, based on water use and protection of water resources.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching - to give theoretical and practical knowledge in the field of integrated water use.

BRIEF DESCRIPTION OF THE COURSE
"Integrated water resources management" is an integrated discipline, and has as its main objective the formation of students' systematic knowledge to address complex water management problems.

Knowledge, skills, skills to complete the course
The student should be able to:

- -use course knowledge to solve today's and future issues of complex use and protection of water resources in the Republic of Kazakhstan;
- - to analyze the performance of the structure and dynamics of water use and protection in the sectors of Kazakhstan's economy;
- - to assess the integrated management of water resources at the current level and to determine future needs in the various sectors of the economy;
- - to work with experimental and statistical data on water consumption and wastewater;

Know:

- - collection of data on water consumption and disposal of various participants HHC;
- - Analysis and synthesis parameters of the structure and dynamics of water use and protection;
- - Mapping of complex use and protection of water resources
- - preparation of the analytical report on the state of use and protection of water resources at the current level, and in the future for different branches and levels of government.

Construction machinery and equipment
CODE -**TRA133**
CREDIT - 6 (2/0/1/3)
prerequisite -

GOAL AND OBJECTIVES OF THE COURSE

Discipline is designed to prepare students for students for practical work in the field of operation of lifting and transport, building and road machines during construction, installation and other types of work.

The tasks of development disciplines:

- the study of the overall device and the value of construction machinery in accelerating scientific and technical progress in the construction in accordance with the objectives set out the main directions of development of the construction industry;

- the need to provide students knowledge on purpose, design, calculation of the basic economic indicators of construction machinery with a view to their effective use in the construction industry, transport and civil engineering structures.

BRIEF DESCRIPTION OF THE COURSE

The process of the discipline (in conjunction with other professional disciplines cycle base part) is aimed at the formation of the following competences:

- possession of the basic laws of geometrical form, construction and mutual intersection of plane models and the space necessary for the performance and reading of drawings of buildings, structures, preparation of design documentation and details;

- knowledge of the regulatory framework in the field of engineering survey, design principles of buildings, constructions, engineering systems and equipment, planning and development of populated areas.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- layout diagrams up-and-transport, building, road machines and equipment, their characteristic s and purpose;

- the operating conditions, operating modes and ways of increasing efficiency in the use of equi pment;

- trends in the development of construction machinery and equipment.

be able to:

- calculate the performance of machinery and equipment in the production of construction and i nstallation work, as well as produce a general model calculations of components, parts and machinery.

own:

- methods of effective use of construction vehicles and equipment in the construction industry.

Gas supply
CODE - HYD116
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, heat transfer, heat and mass transfer, engineering systems.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "Natural" discipline is the acquisition of the students theoretical knowledge and practical skills necessary for an understanding of the gas fuel supply systems of consumers, ensuring uninterrupted gas supply with the work of main and auxiliary equipment, management of gas fuel consumption through the use of modern science and technology, taking into account the prospects development of the gas industry.

BRIEF DESCRIPTION OF THE COURSE
Discipline "Gas" gives an idea about the properties and characteristics of the gaseous fuel, the methods of gas consumption of the device and the operating principle of equipment installed on the gas networks, of combustion processes, constructions of gas burners and their methods of calculation.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- basic properties of flammable gases, the concept of production, transportation and storage of gas, gas consumption modes of the gas consumption pattern in RK, prospects of gas in RK;
- scheme and the device city, municipal and industrial systems, gas classification;
- modern methods of operation of gas supply systems, condition monitoring, testing and acceptance into operation, maintenance and repair of gas supply systems;
- liquefied hydrocarbon gases consumer supply system, the basic physical and chemical properties of gases and biphasic mixtures displacement processes, liquefied gases transport means, the installation of liquefied gases by consumers;
- processing schemes and devices filling stations;
- Theoretical bases of combustion and combustion gases;
- device characteristics and gas burners, methods for reducing toxic components in exhaust gases;
- apparatus and installation of gas appliances, plates, water heaters, gas heaters.

In addition, the student must be able to:

- perform calculations of the annual gas consumption in the cities;
- perform hydraulic calculations of gas networks, expect reliability, produce technical and economic calculations;
- select gas burners for household installations, boilers, burner design and count;
- perform filling stations project;

Fluid mechanics
CODE - HYD134
CREDIT - 6 (1/0/2/3)
Prerequisite - physics, mathematics, chemistry, water supply, sewerage, water supply industrial enterprises, wastewater, industrial enterprises, rational use of water, maintenance of water supply and sewerage systems, reconstruction of engineering systems and facilities.

GOAL AND OBJECTIVES OF THE COURSE
The specific objective of the training of specialists in these disciplines is acquainted with the laws of motion of the liquid, forms of fluid motion and their physical essence, the application of fluid motion laws to calculate the size of culverts and to the regulation of flows and fluvial processes at the intersections of water and wastewater systems and hydraulic structures watercourses.

BRIEF DESCRIPTION OF THE COURSE
Fluid mechanics is a fundamental discipline that studies the laws of motion of fluids and their application to solve engineering problems. Place these sciences in the training of engineers, bachelors on the specified specialties is due to the fact that the basic dimensions of all engineering structures of water supply and sewerage systems of interacting with the flow of liquid, determined by the hydraulic and hydrologic calculations.

Knowledge, skills, skills to complete the course
After studying the discipline, the student must:

- **Know:**The laws of fluid flow; the physical nature of the phenomena; shape of the liquid motion and the equation, they are described; methods for studying the interaction of flows with track and structures; especially water movement in engineering constructions water and wastewater systems.
- **be able to:**determine the size of culverts water and wastewater systems based on hydraulic and hydrological studies of their design; conduct hydraulic calculations uniform, unsteady and uneven fluid flows; count conjugation befov and quenching flow energies; conduct calculations culverts (inlet and outlet channels, bridges, pipes, kosogornyh facilities, etc..), hydrography and maximum water flow, channel deformations in podmostovyh beds, in the downstream pipe road, to be able to perform hydraulic calculations of uniform and non-uniform motion of the liquid.

Computer graphics in construction drafting
CODE -**CIV105**
CREDIT - 3 (1/2/0)
prerequisite - Mathematics I, Engineering Graphics

GOAL AND OBJECTIVES OF THE COURSE

The goal of teaching "Computer graphics in construction drafting," is to learn students modern methods and means of computer graphics; the acquisition of knowledge and skills to build a two-dimensional geometric models of objects with the help of the graphics system.

The tasks of development disciplines

Student in accordance with the professional activities should address the following professional tasks:

In the field of surveying and design activity:

– collection and systematization of information and baseline data for the design of buildings, structures, engineering systems and equipment, planning and building of settlements;

– calculation and design of parts and assemblies using standard computer-aided design;

– preparation of design and working of technical documentation, design of complete design work;

– ensuring that the development projects and technical documentation specification, standards, norms and regulations, technical specifications and other executive documents.

In the field of production and processing and production and managerial activities:

– organization of workplaces, their technical equipment, installation of processing equipment;

– control of technological discipline;

– maintenance of technological equipment and machinery;

– organization of metrological support of technological processes, the use of standard quality control of construction products, machinery and equipment;

– part in the work on the final design and development processes in the preparation of construction, Building Materials, products and structures, manufacture of machinery and equipment;

– implementation of environmental safeguards;

– organization of the work of small groups of performers, scheduling of personnel and wage funds;

– preparation of technical documentation (schedules, instructions, plans, estimates, orders for materials, equipment), as well as the established reporting on approved forms;

– the execution of standardization work and preparation for certification of technical means, systems, processes, equipment and materials;

– fulfillment of quality management system documentation

– the development of operational plans for the work of the primary production unit;

– conducting cost-benefit analysis of activity of the production unit.

BRIEF DESCRIPTION OF THE COURSE

Basic principles of computer-aided design systems. Graphics primitives and their modification. Working with text, blocks, layers. Three-dimensional surface and in the body. Fundamentals of building the dash-ments in the AutoCAD system. Construction of perspective and shadows in run using AutoCAD system. Post-swarming of shadows in orthogonal and axon projections in the metric system AutoCAD. Projection with numerical markings, the construction-of excavation boundaries in AutoCAD system. Construction axonometric projections of different methods ("squeezing", "rotation") in AutoCAD system.

Knowledge, skills, skills to complete the course
As a result of the development of the discipline the student should know:

- hardware and software implementation of information technology;
- global and local computer networks;
- the design documentation, an assembly drawing, the elements of geometry parts axonometric projection parts, images and symbols of parts, based on computer modeling.

be able to:

- use computer technology to solve practical problems;
- harness the power of computers and software;
- build axonometric projection, perform sketches using computer technology, read assembly dr awings and execute design documentation.

own:

- basic methods work on a personal elektronnovychislitelnoy machine (PC) with the application software; - computer software design and development drawings.

Architecture and construction of industrial buildings and structures
CODE -**CIV106**
CREDIT - 6 (2/0/1/3)
prerequisite - Architecture, Mechanical Engineering, Engineering Graphics

GOAL AND OBJECTIVES OF THE COURSE

The aim of the development of the discipline "Architecture and design of industrial and civil," is the acquisition of the students general information about the civil and industrial buildings: their structural parts and components, methods of space-planning and design solutions, dictated by the functional, technical and aesthetic requirements, as well as the choice of building structural systems taking into account the loads and impacts on them. To acquaint students with the peculiarities of contemporary prefabricated construction solutions, as well as large-and tall unique buildings and structures.

BRIEF DESCRIPTION OF THE COURSE

"Architecture and industrial designs. Buildings and Structures "is an architectural training of future professionals, which provides the fundamental direction of the formation of a civil engineer. The course outlines the functional technological and aesthetic problems of architecture, its integrity in the complex representation of the creative work in the field of design and construction of buildings and structures for various purposes.

Knowledge, skills, skills to complete the course
As a result of the development of the discipline the student should know:

- fundamental problems of designing high-rise residential buildings: typology, classification, requirements, methods of architectural composition, space planning and design solutions;
- design features of residential high-rise buildings and high-rise with a view of the fire safety and life support requirements;
- Basics of designing public buildings: typology, classification, requirements, methods of architectural composition, space planning and design solutions;

be able to:

- technically correctly to design space-planning and design solutions for civil and industrial buildings: residential high-rise, high-rise and high-rise, as well as public and industrial buildings: assign space-planning parameters, the design of the system and the scheme on the basis of current trends in construction;
- design the building envelope of modern, efficient Building Materials;
- to conduct physical and technical calculations with the current requirements and the use of computer programs and computer systems.

have possession of skills:

- graphical methods of solving metric tasks of spatial objects in the drawing;
- computer systems for physical-technical calculations in the field of building physics; - graphical computer programs AutoCAD, ArchiCAD, and others for the design of architectural and engineering drawings of the designed object..

Design and calculation of structural elements
CODE -**CIV467**
CREDIT - 6 (2/1/0/3)
prerequisite - Concrete Structures I, reinforced concrete structure II, building structures, Mechanical Engineering

GOAL AND OBJECTIVES OF THE COURSE

The objectives of the development of the discipline "Design and calculation of structural elements" are:

- students with knowledge about the structural elements made of concrete, stone, metal, wood and plastics for various types of stress state, as well as the methods of their calculation and design.

The objectives of the study of this discipline are:

- assimilation of the main provisions of calculation and design of structural elements;
- the application of normative and technical documentation in the calculation of structural elements.

BRIEF DESCRIPTION OF THE COURSE

In this discipline "Design and calculation of structural elements" deals with the designing of building objects and their structural elements taking into account the strength, stiffness, stability under the influence of permanent and temporary loads. As construction material for building constructions using reinforced concrete, masonry, metal (steel, aluminum alloys), wood, plastics. the possibility of building work are also considered as part of the spatial system and release it in a simpler independent object.

Knowledge, skills, skills to complete the course
As a result of the development of the discipline the student should know:

- the main physical and mechanical properties of materials;
- fundamentals of the method of calculation of structural elements limiting conditions;

be able to:

the defining form stress state of structural elements;
itself-choose the most cost-effective design solution;
-vypolnyat calculations and design of the main carrier elements;
- correctly use regulatory, instructional and technical literature;

have the skills to:

- knowledge of modern science about the state of metal, concrete, wood and plastics;
- the main directions of improving the methods of calculation of constructions made of these materials;
- the choice of the most effective design solutions to achieve the most cost-effective option;
- qualitatively and quantitatively evaluate the section of the main load-bearing structures made of different materials.

Foundations
CODE -**CIV142**
CREDIT - 6 (2/0/1/3)
prerequisite - Architecture, Soil and soil mechanics

GOAL AND OBJECTIVES OF THE COURSE

The objective of the course "Foundations" is to instill in students the knowledge and skills in the design and construction of reliable, sustainable, technological and economic grounds, and the foundations of buildings and structures. To fulfill this goal in the study of the course is necessary to do the following:

1. To acquaint students with the objectives of the subject and composition of geological engineering survey, teach them to fully assess the characteristics of engineering - geological conditions of the construction site and the ability to change these conditions during the construction and operation of buildings and structures.

2. To acquaint students with modern methods of evaluation of the working conditions of the soil at the base of buildings and structures, and teach them to use these methods to determine the stability and deformability of the foundation.

3. To acquaint students with the existing methods and techniques of calculation of foundations, foundation design solutions and innovative ways of works on their device, and on this basis to teach students to independently solve problems in the design and construction of the foundations using rational methods, regulatory, reference books and computer technique.

BRIEF DESCRIPTION OF THE COURSE

It sets out the basic principles of bases and foundations in different soil conditions of the construction site. The features of the construction of pile foundations, deep foundations. The questions of design and installation of foundations in the regional context, the construction and reconstruction of foundations.

General principles for the design of the foundations, foundations in open pits on a natural basis, pile foundations, methods of artificial improvement of foundation soils, design of pits, deep foundations, buried and underground structures, construction of a structurally unstable, rock, eluvial soils and zakarstrovannyh and undermined territories foundations under dynamic loads, reconstruction and strengthening the foundations of reason.

Knowledge, skills, skills to complete the course

As a result of the development of the discipline the student should know:

- general principles for the design of the foundations;
- improved methods of artificial soil base; foundations in open pits on a natural basis;
- pile foundations; Shallow foundations; computer-aided design of foundations.

be able to:

- thoroughly evaluate the features of engineering - geological conditions of the construction site and the ability to change these conditions during the construction and operation of buildings and structures;
- the right to use the methods of assessing the working conditions of soil at the base of buildings and structures for determining the stability and deformability bases;
- independently solve problems in the design and construction of the foundations using rational methods, regulatory, reference books and computer equipment.

have the skills to:

- estimation of soils and conditions them as base for construction and reconstruction of building s and structures;
- the design and construction of foundations;
- goals, objectives, principles of settlement of foundations;
- perspective directions of development of the foundations.

Concrete Structures II
CODE -CIV118
CREDIT - 6 (2/0/1/3)
Prerequisite - Architecture, Reinforced concrete structures 1, Mechanical Engineering.

GOAL AND OBJECTIVES OF THE COURSE

The purpose of the development of the discipline: Students get acquainted with the basic building structures of reinforced concrete. Competent calculation loads. Basic principles of the calculation of bearing and enclosing structures made of reinforced concrete. Proper design of the main load-bearing structures of buildings and structures.

Discipline objectives: Developing students' desire to improve the outlook for the construction and use in the construction sector of the engineering equipment in accordance with modern energy-saving technologies, skills to ensure safety in the area of professional activity.

BRIEF DESCRIPTION OF THE COURSE

Discipline "Reinforced Concrete Structures II» requires students to master the basic provisions concerning the use of reinforced concrete in the construction of buildings and structures.

Knowledge, skills, skills to complete the course

This discipline reflects the state of the art design and calculation of reinforced concrete structures in the volume corresponding to the course program as a result of studying the discipline the student should know:

- methods for the determination of internal forces, the method of calculating the strength and deformability of reinforced concrete structures of one- and multi-storey civil industrial buildings;
- methods of design of reinforced concrete structures;
- innovative solutions of structures and facilities, the prospects for their development.

be able to:

- to develop constructive systems of buildings and structures;
- to carry out the calculation and design of their regulatory elements using, instructional and technical literature.

own:

- skills of practical analysis of structures strength, deformability, instructional and technical literature.

Heating
CODE - HYD145
CREDIT - 6 (2/0/1/3)
Prerequisite - mathematics, physics, chemistry, engineering systems I, heat and mass transfer, building thermal physics, heat-generating plant.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "Heating" is the acquisition of the students theoretical knowledge and practical skills in the basics of design, device, installation and operation of heating systems.

BRIEF DESCRIPTION OF THE COURSE
Discipline "Heating" reflects the current state of the theory and practice of heating systems; it sets out the basis for calculating the design, startup and operation of systems in residential, public and industrial buildings. The issues dedicated to the improvement and development of heating systems, renewable energy, thermal energy savings in heating buildings and others.

Knowledge, skills, skills to complete the course
As a result of studying the discipline "Heating" a student must:
Know:
- sanitary, technological bases of heating;
- species characteristics and heating systems;
- particularly drawing up the heat and air balance of the premises for heating;
- types and characteristics of heating equipment;
- methods of calculation pipelines and heating equipment.

be able to:
- to put into practice the theoretical knowledge and skills;
- determine the power of the heating system;
- utilize hydraulic calculations techniques systems;
- to determine the area of the heating surface of the heating devices;
- to design the heating system using modern equipment and technologies;
- to carry out the reconstruction, testing, commissioning and operation of heating systems.

Wastewater treatment technology
CODE - HYD162
CREDIT - 6 (1/0/2/3)
Prerequisite - hydraulics, water chemistry and microbiology, water transport.

GOAL AND OBJECTIVES OF THE COURSE

The purpose of teaching "wastewater treatment technology" is the acquisition of the students theoretical knowledge and practical skills in the basics of design and calculation of wastewater treatment plants.

BRIEF DESCRIPTION OF THE COURSE

In the discipline are given basic information about the drainage system and the composition of waste water. Given the materials to review the appointment, terms and principles of operation, structures, methods of calculation and design of drainage networks, pumping stations, treatment plants. Methods and technological schemes wastewater and sludge treatment.

Knowledge, skills, skills to complete the course

As a result of studying the discipline "wastewater treatment technology" the student should know:

- Methods and wastewater purification scheme;
- types and constructions main drainage facilities for waste water treatment;
- bases of calculation of drainage facilities for wastewater treatment;
- basic methods and facilities for sludge treatment.

In addition, the student must be able to:

- select flowsheet wastewater treatment;
- define the basic parameters of the cleaning process and wastewater treatment;
- choose methods of wastewater treatment.
- use the methods of determination specified rates basic equipment treatment facilities wastewater treatment;
- calculate and select the basic equipment and the elements of treatment facilities wastewater treatment;

Metal structures II
CODE -CIV133
CREDIT - 6 (2/0/1/3)
Prerequisite - Metal Constructions I, Architecture, Mechanical Engineering, Architecture industrial buildings.

GOAL AND OBJECTIVES OF THE COURSE

The purpose of the discipline "Metal Constructions II» is - a deepening of knowledge acquired earlier on the subject "Metal Constructions I», ability and skills in the design and application of steel and aluminum structures in construction practice.

Objectives of the course - to form students' theoretical knowledge, skills and competence in the solution of contemporary problems in the design of steel and aluminum structures, in particular:

- by applying the basic concepts, methods and calculation methods of modern steel and aluminum structures;
- through the use of theory and practice of modern approaches and trends in the calculation and design of steel and aluminum structures.

BRIEF DESCRIPTION OF THE COURSE

Discipline "Metal Constructions II» requires students to master the basic provisions relating to the use of steel and aluminum alloys in structures of buildings and structures.

Knowledge, skills, skills to complete the course
As a result of study of discipline a student must**know:**

- principles of operation and applications of metal structures and welded joints;
- the strength characteristics of planar and three-dimensional metal structures.

be able to:

- select and use bearing and protecting designs applied design problem;
- make calculations of metal structures and their connection with the help of modern settlement systems.

Water Transportation
CODE - HYD160
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, hydraulics.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "Transportation Water" discipline is the acquisition of the students theoretical knowledge and practical skills in the basics of design, engineering calculations and operation of water conveyance systems.

BRIEF DESCRIPTION OF THE COURSE
Discipline "Transportation Water" gives an idea of the theoretical foundations and practical basic provisions of the design, calculation and device transport natural and waste water systems.

Knowledge, skills, skills to complete the course
As a result of studying the discipline "Transport of water" the student should know:

- bases transporting natural laws, water and waste water;
- apparatus and principle of operation of water conveying systems;
- bases of calculation and design of engineering systems.
- In addition, the student must be able to:
- to put into practice the theoretical knowledge and skills;
- use the methods of determination specified rates basic equipment engineering systems;
- calculate and select the main items of engineering equipment and water transport systems

Heat supply
CODE - HYD155
CREDIT - 6 (2/0/1/3)
Prerequisite - mathematics, physics, chemistry.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "Heat" is the acquisition of the students theoretical knowledge and practical skills of designing and arrangement of heating systems.

BRIEF DESCRIPTION OF THE COURSE
The discipline "Heat" provides the basic theoretical knowledge and basic provisions of the design and equipment of heating systems.

Knowledge, skills, skills to complete the course
As a result of studying the discipline "Heat," the student should know:

- theoretical bases and methods for determining heat fluxes;
- selection of the type of heat source;
- principles of design of heating systems;
- methods for controlling the heat supply;
- methods of hydraulic calculations of heat networks;
- methods of determining the cost of network water;
- development methods of hydraulic modes;
- selection of pump heat source.

be able to:

- to put into practice the theoretical knowledge and skills;
- use computational methods for determining indicators for the design of centralized urban heating systems;
- develop modes of hydraulic heating networks;
- the use of modern technology in heating systems.

The technology of construction of buildings and structures
CODE -CIV138
CREDIT - 6 (2/0/1/3)
Prerequisite - Architecture, Building materials, construction technologies I

GOAL AND OBJECTIVES OF THE COURSE

The aim of the course is the study of the theoretical foundations and practical implementation of the rules of implementation of the integratedconstruction and installation workfor buildings and structures.

To achieve this goal in the process of teaching the following tasks:

- Analysis of the technology of construction of underground facilities in urban areas;
- analysis of production experience in the construction of buildings of stone materials;
- analysis of production experience in the installation of precast concrete andmetal structures;
- analysis of the advanced technology of monolithic housing construction.

BRIEF DESCRIPTION OF THE COURSE

The aim of the course discipline «Technology of construction of buildings and structures" is the formation of professional knowledge and practical skills required of future civil engineer. In the discipline "Technology of erection of buildings and structures" learn the basics and practical implementation of the regulations of performance of certain types of construction, erection and special construction works during the construction of special engineering structures and to obtain product in the form of the completed construction of engineering structures.

Knowledge, skills, skills to complete the course

As a result of studying the discipline "Technology of erection of buildings and constructions of" the student should know:

- modern technologies of construction of buildings and structures;
- the main methods of execution of certain types of facilities and construction and installation works;
- the basic methods of linking technological construction and installation works;
- method of designing the main process parameters at different stages of the erection of the building; the content and structure of the production of projects of construction of buildings and structures;

be able to:

- to design a common and specialized manufacturing processes; develop a schedule for construction and installation works;
- develop buildinggeneral planat different stages of the construction of buildings and structures; form structure construction; carry the variant design technology of construction of buildings and structures;

own:

- ability to develop operational plans for the work of primary production units, to conduct analysis of the costs and benefits of production units, to compile the technical documentation, as well as the established reporting on approved forms (PC-16).

Design and calculation of special buildings
CODE -CIV152
CREDIT - 6 (1/0/2/3)
Prerequisite - Concrete Structures 1, Metal structures I, Architecture

GOAL AND OBJECTIVES OF THE COURSE

The purpose of teaching "Design and calculation of special buildings" as a discipline of choice for specialty 6B0730 «Building and manufacture of building materials and structures" is to familiarize students with the fundamentals of calculation and design of special facilities (tanks, bins, silos, water towers, etc.)..

BRIEF DESCRIPTION OF THE COURSE

The subject of "Design and calculation of special buildings" - a course that studies the architectural solutions, as well as issues of design and analysis of various types of engineering structures, which are the functional characteristics include the following groups: structures for supporting and placing equipment; communications and transport structures - tunnels, canals, sewers, props and trestles; capacitive structures for water drain; water towers, tanks, gas tanks; silos, bunkers, chimneys, retaining walls, and others. We also consider the significance and role of engineering structures to create an image of modern industrial enterprises. As practice shows, expressiveness and a silhouette of the company in all cases is not only the architectural design of individual buildings, but also on their interactions with engineering structures.

Knowledge, skills, skills to complete the course

As a result of studying the discipline "Design and calculation of special buildings" the student should know:

- species of special buildings;
- particularly space-planning and designs of special structures;
- fundamentals of calculation and design of special facilities.

be able to:

- to determine the internal forces in various types of special facilities;
- the right to design various types of special facilities;
- find and use scientific and technical information.

The technology of building production I
CODE -CIV186
CREDIT - 6 (2/0/1/3)
Prerequisite - Architecture, Building Materials, Mathematics I, Mathematics II

GOAL AND OBJECTIVES OF THE COURSE

The purpose and objective of the discipline is to provide in accordance with the qualifying characteristic BA in 6B0730 «Building and manufacture of building materials and structures" of knowledge and skills necessary for successful performance in the future, relevant functional responsibilities in all positions and in all divisions related to the field of construction.

To study the structure of the construction process, construction and installation works, their rational and industrial methods and production methods in the construction of residential and public buildings and structures, as well as the basics of the design process.

BRIEF DESCRIPTION OF THE COURSE

Discipline "Technology of building production" represents, a special discipline and studies the laws among all kinds of civil works to be carried out in certain technological sequence in order to get in the shortest time high-quality and cost-effective products. The purpose of teaching is to study the technology of construction processes and deriving from them the general theoretical propositions which form the basis of courses of special subjects as well as training professionals able to use the acquired knowledge and skills in their professional activities.

Knowledge, skills, skills to complete the course

As a result of study of discipline a student must**know:**

- the most rational methods of production rules and acceptance of construction and assembly works and their relationship;
- the use of techniques in the production of works of building machines and devices;
- labor protection measures and nature related to the implementation of construction and installation works;
- quality control issues of construction and installation works.

be able to:

- develop the technological card for production of construction processes using the integrated mechanization and advanced methods of work;
- to make clothes and calculation of labor costs and workers' wages;
- proper use of technical, reference and normative literature for the purpose of proper selection and justification of methods of production of construction and installation works.

The technology of water purification
CODE - HYD169
CREDIT - 6 (1/0/2/3)
Prerequisite - hydraulics, water chemistry and microbiology, water transport.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "Natural water technology" is the acquisition of the students theoretical knowledge and practical skills in the basics of design, calculations and operation of engineering systems of water purification.

BRIEF DESCRIPTION OF THE COURSE
In the discipline of "natural water purification technology" gives an idea of the theoretical foundations and practical design of the main provisions of calculation and equipment water purification systems.

Knowledge, skills, skills to complete the course
As a result of studying the discipline "Technology of water purification," the student should know:
- bases of calculation and design of engineering systems for water purification.

In addition, the student must be able to:
- to put into practice the theoretical knowledge and skills in water treatment technology;
- use the methods of determination specified rates basic equipment engineering systems purification of natural waters;
- calculate and select the basic equipment and the elements of engineering systems purification of natural waters.

Heat-generating installation
CODE - HYD151
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, engineering systems, hydraulics and aerodynamics, heat and mass transfer.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "Heat-generating installations" yavlyaetsyapriobretenie students theoretical knowledge and practical skills required dlyaponimaniya processes and phenomena associated with heat production for nuzhdkommunalno domestic and process consumers, rational and effektivnymispolzovaniem fuel and energy resources on the basis of modern tehnicheskihresheny and taking into account the prospects of development thermal generation plants and their components.

BRIEF DESCRIPTION OF THE COURSE
Discipline "Heat-generating installation" gives an idea about the properties and characteristics of the energy fuels, the processes of combustion, methods of burning fuels, the device and the principle of operation of main and auxiliary heat generating equipment units.

Knowledge, skills, skills to complete the course
As a result of studying the discipline "Transportation of waste water," the student should know:

- basic information about the origin, classification, composition and properties of fuels;
- Modern methods and means of thermal energy;
- Theoretical bases of processes of burning fossil fuels;
- modern methods of calculation of heat generating plants;
- schemes and designs TSU and their basic elements;
- aqueous TSU mode;
- TSU and thermal circuit technique of calculation;
- fuel economy and system shlakozoloudaleniya TSU;
- foundation **TSU design.**

In addition, the student must be able to:

- select and validate the input data for calculation and design of the TSU;
- design and technological schemes rely heat production, heat-generating equipment and its components;
- develop arrangements for fuel and thermal energy savings, reduction of emissions **substances.**

Reliability of building structures
CODE -CIV170
CREDIT - 6 (2/0/1/3)
Prerequisite - Mechanical Engineering-2 Building structures, Building Materials, building structures 1, Engineering Mechanics.

GOAL AND OBJECTIVES OF THE COURSE

The objectives of the development of "Reliability of building structures" discipline are

- formation of students' knowledge of the general laws of the manifestations of quantitative and qualitative properties of construction projects using features methods of the theory of reliability of buildings and structures;

- using information obtained during the measurements of the quantitative properties of objects (buildings) for quantitative and qualitative evaluation of their condition in terms of reliability in their design, installation and operation;

- formation of students' basic understanding of the role of theory and reliability to ensure the safety and quality in construction.

Problems of the discipline:

- learn the basic concepts of safety, reliability, model assessment of reliability and durability of buildings and structures, the formation of the quality of construction.

- learn how to use basic methods of reliability theory in the development of engineering techniques for the assessment of quality, workmanship, installation and design of structures and facilities.

BRIEF DESCRIPTION OF THE COURSE

Discipline "Reliability of building structures" examines the general principles of reliability of building structures. Also, formation of students' knowledge of the general laws of the manifestations of quantitative and qualitative characteristics of construction using features methods of the theory of reliability of buildings and structures; Use obtained when measuring quantitative information about the properties of objects (buildings) for quantitative and qualitative evaluation of their condition in terms of reliability in their design, installation and operation; formation of students' basic understanding of the role of theory and reliability to ensure the safety and quality in construction. Learning the basic concepts of reliability, reliability, reliability evaluation model and durability of buildings and structures.

Knowledge, skills, skills to complete the course

As a result of study of discipline a student must**know:**

- the basic regulations on safety of building structures;
- the methods for collecting and processing information on the state of building structures;

be able to:

- use of the existing regulations in determining the reliability of building structures;
- determine the value of constructions reliability parameters of buildings and structures.

own:

- Information materials on the reliability of buildings and structures;
- the ability to evaluate the reliability of buildings and structures.

Professional computer software and information technology in construction
CODE -CIV154
CREDIT - 6 (1/0/2/3)
Prerequisite - Engineering and computer graphics

GOAL AND OBJECTIVES OF THE COURSE

To study computer programs and technologies that are used in modern building design, in order to improve the quality and reduce design timing, reduce material construction sites, perform the variant design, as well as reduce the cost of design work.

BRIEF DESCRIPTION OF THE COURSE

This discipline reflects the modern professional computer software and information technology in construction. The technique of construction of finite element models; recommendations for the compilation of design schemes and methods for their solutions and examples of mathematical models of structures of different types and purposes. The examples of numerical analysis of the different designs found in the graduation design and practice of the design of existing objects.

Knowledge, skills, skills to complete the course
As a result of study of discipline a student must **know:**

- fundamentals and design challenges;
- basic modern computer programs used for the calculation of buildings and structures, as well as building structures and their elements;
- basic computer technology used in the design;
- the advantages and disadvantages of various programs;
- the types of finite elements in the frequently used programs;
- loads and impacts on the considered model calculates the object;
- the procedure for preparation of the initial input data;
- the composition of the final document resulting from the calculation;
- to create a simulation model of the construction of the object;
- calculate a planar or spatial structure consisting of rods and plates for computer programs;
- to evaluate the model of the building and take the necessary engineering solutions;
- carry out the export of the data elements in the construction of the program;
- to carry out an analysis of the results after the execution of programs;

own:

- modern computer programs and technology to be used in the design of buildings and structures.

be able to:

- practical use of modern computers to perform mathematical calculations, design calculation results;
- modern information technologies, including methods of producing, processing and storage of scientific information.
- in the calculation and design of engineering problems;
- in the use of regulatory and technical literature.

Modern computer simulations
CODE -CIV161
CREDIT - 6 (1/0/2/3)
Prerequisite - Mechanical Engineering - II, Concrete Structures I, Metal structures I, Mechanical Engineering.

GOAL AND OBJECTIVES OF THE COURSE

To study computer programs and technologies that are used in rooms Modern building design, in order to improve the quality and reduce the time of designing, reduce material construction sites, perform the variant design, as well as reduce the cost of design work.

BRIEF DESCRIPTION OF THE COURSE

Modern computer programs for calculation of building structures. Preparation of calculation schemes. Principles of construction of finite element models. Rational split into finite elements. Calculation of dynamic effects including seismic loads. Superelement modeling. Appointment of LIRA software package. Software complex LIRA and its systems. Graphical environment LIR-VISOR. Purpose and opportunities construe systems LIR-STC and LIR-ARM. Analysis calculated results. Terms of characters when reading the results of calculation. Rules of reading efforts for finite element analysis. Documenting.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- fundamentals and design challenges;
- basic modern computer programs used for the calculation of buildings and structures, as well as building structures and their elements;
- basic computer technology used in the design;
- the advantages and disadvantages of various programs;
- loads and impacts on the considered model calculates the object;
- the procedure for preparation of the initial input data;
- the composition of the final document resulting from the calculation;
- to create a simulation model of the construction of the object;
- to evaluate the model of the building and take the necessary engineering solutions;
- carry out the export of the data elements in the construction of the program;
- to carry out an analysis of the results after the execution of programs.

be able to:

- practical use of modern computers to perform mathematical calculations, design calculation results;
- current scientific literature;
- modern information technologies, including methods of producing, processing and storage of scientific information;
- in the calculation and design of engineering problems;
- in the use of regulatory and technical literature.

own:

- modern computer programs and technology to be used in the design of buildings and structures.

The technology of building production II
CODE -CIV187
CREDIT - 6 (2/0/1/3)
Prerequisite - Architecture, Building materials, construction technologies I

GOAL AND OBJECTIVES OF THE COURSE

The aim and purpose of discipline is to ensure, in accordance with the qualifying characteristic of a civil engineer in the specialty 050729 "Construction" of knowledge and skills necessary for the successful implementation of the future responsibilities of the relevant functional in all positions and in all units within the scope of activity in civil engineering.

To study the structure of the construction process, construction and installation works, their rational and industrial methods and production methods in the construction of residential and public buildings and structures, as well as the basics of the design process.

BRIEF DESCRIPTION OF THE COURSE

Discipline "Technology of building production - II» learn the basics of the practical implementation of the regulations and the construction of civil engineering techniques in order to obtain the final product (finished construction of buildings of various functional purpose). The purpose of discipline is to consolidate, deepen and synthesis of knowledge gained during the theoretical training on the installation work technology in the preparation of the flow chart for the installation of building structures aboveground part of the building contributes to the development of students' skills to work with standard-help literature, performing calculations, preparation of settlement - an explanatory note.

Knowledge, skills, skills to complete the course

As a result of studying the discipline "Technology of building production II» the student should know:

- industrial methods of construction of buildings and structures;
- Basics in-line performance of certain types of construction and installation works;
- scheduling during construction and installation works;
- technology features engineering preparation of the construction site;
- the methodology of technological design of certain types of construction and installation works,
- the content and structure of the project of construction and installation works;
- regulations of technology of erection of buildings and constructions.

be able to:

- to design a specialized stream, develop schedules for certain types of construction and installation works;
- develop a general plan of the building at different stages of the construction of buildings and structures, to form the structure of the construction work;
- to carry out the variant design methods for the construction of buildings and structures (including by computer);
- to develop projects of construction and installation works;
- to develop regulations on construction technology of various construction and design characteristics of buildings and structures.

Design and calculation of spatial structures
CODE -CIV151
CREDIT - 6 (1/0/2/3)
Prerequisite - Concrete Structures II, Metal structures II, Ferro spatial coverage.

GOAL AND OBJECTIVES OF THE COURSE

The purpose of the development of the discipline is to acquire knowledge and specific experience in the analysis of the students work, calculation and design of long-span structures coatings constructed of reinforced concrete and steel.

Tasks of the discipline:

- absorption of theoretical span coatings calculation and construction preconditions;
- the acquisition of skills of designing coatings span structures made of reinforced concrete and metal;
- structural design with optimal technical and economic indicators.

BRIEF DESCRIPTION OF THE COURSE

Discipline "Design and calculation of spatial structures" implies mastery of the students the basic provisions relating to the development of large-span buildings with expedient unity of construction and of technical and economic factors.

Classification of spatial structures. Main position calculating spatial structures for strength and stability.

Knowledge, skills, skills to complete the course

As a result studied the discipline the student should know:

- general information about the buildings with large spans and its elements: the structure of the building, supporting and enclosing structures;
- basics of functional design, the typology of large-span buildings, nomenclature and physical and technical properties of Building Materials for buildings of large spans;
- the main methods of calculation of static spatial structures of steel and concrete;
- Basics of designing load-bearing structures and their components.

be able to:

- to develop the architectural - construction drawings of buildings larger spans, including by means of computer programs to design the load-bearing structures;
- to determine the bearing capacity of spatial structures of steel and concrete.

own:

- functional skills, composition and volume-spatial design of buildings with large spans, be skilled engineering calculations and design.

Quality control of building installation work
CODE -CIV128
CREDIT - 6 (2/1/0/3)
Prerequisite - Building materials Architecture.

GOAL AND OBJECTIVES OF THE COURSE

The study of this discipline is to train professionals for the design and production of technical supervision and quality control of construction.

Discipline objectives are as follows:

Knowledge of modern methods of design and construction and installation works using sets of construction machinery, equipment, rational organization of work in the construction, repair and reconstruction of buildings and structures.

BRIEF DESCRIPTION OF THE COURSE

Discipline "control the quality of construction and installation work" examines the fundamentals and the practical implementation of the regulations techniques construction of civil engineering projects in order to obtain the final product (finished construction of buildings of various functional purpose). The purpose of discipline is to consolidate, deepen and synthesis of knowledge gained during the theoretical training on the installation work technology in the preparation of the flow chart for the installation of building structures aboveground part of the building contributes to the development of students' skills to work with standard-help literature, performing calculations, preparation of settlement -poyasnitelnoy note.

Knowledge, skills, skills to complete the course

As a result of studying the discipline the student should know:

- the basis of structural design, engineering preparation of a building site in terms of new construction and reconstruction;
- technical regulations on construction, repair and reconstruction of buildings and structures, acceptance and quality control activities;

be able to:

- use reference-normative literature;
- to design and implement technological support of construction and installation processes;
- to carry out special inspection of buildings and structures, field and laboratory testing of building materials, products and structures;

have the skills to:

- the development of specialized programs of surveys of buildings and structures;
- the statements of defects and structural damage;
- solving complex problems in quality assurance of civil and erection works.

Concrete spatial coverage
CODE -CIV120
CREDIT - 6 (1/0/2/3)
prerequisite -Mechanical Engineering - 2, reinforced concrete structure 1, Concrete Structures II, Mechanical Engineering

GOAL AND OBJECTIVES OF THE COURSE

The study of modern technical methods of operation of buildings and urban areas, ways and methods of organization of management of the operation of buildings and structures, the order of inspection and technical inspection of buildings and structures technical condition of buildings assessment methods and structures, methods to improve the performance of building designs and engineering of modern methods of equipment repair and modernization of residential buildings.

Tasks of the discipline:

- absorption of theoretical assumptions for analysis and design of spatial coatings;
- the acquisition of skills of spatial design covers made of reinforced concrete;
- structural design with optimal technical and economic indicators.

BRIEF DESCRIPTION OF THE COURSE

Reinforced concrete spatial structures should be provided with the required reliability of the occurrence of all types of limit states calculation, choice of indicators of quality of materials, dimensioning and designing according to these set of rules. This should be carried out the technological requirements in the production structures and complied with the requirements for maintenance of buildings and structures, as well as the requirements for the environment, sets the appropriate regulations.

Knowledge, skills, skills to complete the course

As a result studied the discipline the student should know:

- the main methods of calculation of static spatial structures of reinforced concrete;
- Basics of designing load-bearing structures and their components.

be able to:

- to develop the architectural - construction drawings of buildings, including the use of computer programs to design the load-bearing structures;
- to determine the bearing capacity of spatial structures of reinforced concrete.
- to analyze the design decisions and develop effective spatial structures

own:

- functional skills, composition and volume-spatial design of buildings, be skilled engineering calculations and design.

Ventilation and Air Conditioning
CODE - HYD103
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, engineering systems, heat and mass transfer, building thermal physics, heating, heat.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "Ventilation and Air Conditioning" is the acquisition of the students theoretical knowledge and practical skills in the design of HVAC systems, the requirements for the air space, the principles of the organization of air in buildings based on energy saving and environmental protection.

BRIEF DESCRIPTION OF THE COURSE
Discipline "Ventilation and Air Conditioning" reflects the current state of the theory and practice of applied aerodynamics and thermo ventilation and air conditioning; it sets out the basis for calculating the design, installation and operation of ventilation and air conditioning systems in residential and public buildings. Examined the properties of air and the processes of change in his condition, air exchange and the organization of air distribution in a room, the basics of aerodynamics of ventilation systems in the building, and local exhaust ventilation is, structural devices and HVAC systems.

Knowledge, skills, skills to complete the course
As a result of studying the discipline "Ventilation and Air Conditioning" the student must **know:**

- sanitary, technological bases of ventilation and air conditioning;
- particularly drawing up the heat and air balance of the room with the air-conditioning;
- methods of determination and organization of air in the room;
- equipment for thermal, processing and humid air purification;
- the system of local and general dilution ventilation of civil buildings;
- the basic principles of reconstruction of ventilation and air conditioning systems.

be able to:

- solve the problems associated with creating and maintaining the required parameters of the internal air environment;
- apply modern principles of designing effective ventilation and air-conditioning units;
- to choose a comfortable environment in the room;
- choosing parameters for the calculated desired air conditioning class;
- to carry out the reconstruction and operation of ventilation and air conditioning systems;
- use energy savings with modern equipment.

Drainage network
CODE - HYD149
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, hydraulics.

GOAL AND OBJECTIVES OF THE COURSE

The purpose of teaching "Drainage Network" is the acquisition of the students theoretical knowledge and practical skills in the basics of design, calculations and operation of engineering systems transporting wastewater.

BRIEF DESCRIPTION OF THE COURSE

Discipline "Drainage Network" provides insight into the theoretical foundations of transporting water engineering calculations and wastewater conveyance system devices.

Knowledge, skills, skills to complete the course

As a result of studying the discipline "Drainage Network" the student should know:

- a basis calculation conveying waste water;
- apparatus and principle of operation of sewage transportation systems;
- foundations and design of engineering systems.

In addition, the student must be able to:

- to put into practice the theoretical knowledge and skills;
- use the methodology for determining the calculation indices network core equipment engineering systems;
- select the basic equipment and elements engineering sewage transportation systems

The construction of earthquake-resistant buildings
CODE -CIV109
CREDIT - 6 (2/0/1/3)
Metal structures I, Concrete Structures I, metal structures II, Concrete Structures II, building structures.

GOAL AND OBJECTIVES OF THE COURSE
The objective of the course "The construction of earthquake-resistant buildings" - the development of knowledge and skills of students required for the design and construction of unique buildings in earthquake zones.

discipline tasks:

- the development of the theory and practice of calculations of buildings and structures on the seismic loads;
- the acquisition of knowledge about the basic principles of earthquake engineering;
- the acquisition of skills of analysis of structures to seismic loads using software packages.

BRIEF DESCRIPTION OF THE COURSE

The subject of "The construction of earthquake-resistant buildings" - a course that studies the technology of construction of buildings with a variety of space-planning and design solutions in the areas of seismic activity. It considers the methods, techniques, and technology of seismic resistant construction.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- the basic laws of the dynamic behavior of structures during earthquakes;
- theoretical foundations and basic methods of calculation algorithms structures on seismic effects;
- the basic regulations on the calculation of buildings and structures on the seismic effects;
- the basic principles of design and implementation of seismic stability of buildings and structures during earthquakes;
- designs of earthquake-resistant buildings and structures;
- social, ecological and economic consequences of the earthquake.

be able to:

- develop constructive measures to ensure the seismic resistance of buildings and structures;
- a circuit for the calculated amount of complex engineering structures and their components when performing dynamic and seismic calculations;
- to analyze and evaluate the results obtained by computer calculations of structures on the seismic loads.

be skilled in:

- perform dynamic calculations of constructions methods of structural mechanics;
- performing dynamic calculations structures using modern software systems.

Geotechnics II
CODE -CIV111
CREDIT - 6 (2/0/1/3)
Prerequisite - Building construction, Mechanical Engineering.

GOAL AND OBJECTIVES OF THE COURSE

Evaluate existing foundations in the reconstruction of buildings and structures, assign the main dimensions of the foundations, underground and aboveground structures in which to ensure their reliability, durability and cost-effectiveness; choose methods and apparatus of underground structures foundation without disturbing the natural structure of the foundation soil.

BRIEF DESCRIPTION OF THE COURSE

The purpose of teaching is to acquaint future specialists with the general provisions of modern methods of calculation, design and grounds device, foundations and underground structures. We consider the foundations of the natural foundations, deep foundations, their calculation and design. Pile foundations, their klac-fication, calculation and design. Features of the design of foundations on loess subsiding soils, weak silty - clayey soils saturated and swelling. Artificial sealing and strengthening of foundation soils. Features of the design of foundations under seismic effects.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- characteristics of foundations near the existing buildings;
- features production work on the construction of foundations.

own:

- Modern methods of calculation and design, the device of the foundations and underground structures.

Thermal and gas networks
CODE - HYD165
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, engineering systems, heating, hot water and heat generating plant.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "Heat and gas networks" is the acquisition of the students theoretical knowledge and practical skills in the basics of designing, reconstruction and intensification of engineering systems and networks.

BRIEF DESCRIPTION OF THE COURSE
discipline "Heat and gas networks" provides the basic theoretical knowledge and basic design provision.

Knowledge, skills, skills to complete the course
As a result of studying the discipline "Heat and gas networks," a student must:

- **Know** - theoretical bases of designing thermal and gas networks;

methods for determining the thermal load and gas consumption by consumers; methods of thermal hydraulic calculations and gas pipelines; development methods of hydraulic modes of heat networks; Installation type of thermal and gas networks and their design.

- **To be able to -** to put into practice the theoretical knowledge and skills;
- use computational methods for determining the parameters for the design of thermal and gas networks of settlements;
- develop wiring diagrams, heat and gas networks;
- the use of modern technology in heat and gas networks, taking into account their reliability.

Water treatment in boilers and heat networks
CODE - HYD158
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, heat-generating plants, heat.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching the subject "Water treatment in boilers and heat networks" is the acquisition of the students theoretical knowledge and practical skills necessary to understand the processes occurring in the water circulating in the heat-generating plants and heat networks, as well as the processes and phenomena taking place in water treatment installations from other treatment feedwater steam boilers and feed water heating networks.

BRIEF DESCRIPTION OF THE COURSE
Discipline "Water treatment in boilers and heat networks" gives an idea of the processes of formation of salt deposits in the TSU and thermal networks of the corrosion of heating equipment, the most common water treatment methods, as well as about the structure and function of the main water treatment equipment.

Knowledge, skills, skills to complete the course
As a result of studying the discipline "Water treatment in boilers and heating networks," the student should know:

- an overview of the characteristics and indicators of water quality;
- an overview of the salt deposit formation processes in the boiler units and thermal equipment;
- General information on corrosion thermal equipment;
- water chemistry of heat-generating plants and heat networks;
- essence deposition methods and magnetic processing method;
- essence ion exchange methods;
- Design and operation of water treatment equipment;
- theoretical basis and practical methods of water decontamination;
- Chelators water treatment methods;
- condensation treatment means;

In addition, the student must be able to:

- evaluate the results of water analyzes;
- to verify the effectiveness of water-chemical mode of TSU;
- to make a choice of water treatment method;
- calculate basic and auxiliary water treatment equipment;
- chemical water treatment plants to produce the selection of equipment and decontamination of water;
- develop schemes of water treatment plants;
- to determine the qualitative and quantitative composition of wastewater CPG.

Industrial water supply and sewerage
CODE - HYD166
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, water, sewage, industrial water supply, rational use of water, closed water supply system, operation of water supply and sewerage systems and reconstruction of engineering systems and facilities.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "Industrial water supply and sanitation" is the acquisition of the students theoretical knowledge and practical skills in the basics of designing, reconstruction and intensification of engineering systems of water supply and sanitation.

BRIEF DESCRIPTION OF THE COURSE
The purpose of teaching "Water supply and drainage of industrial enterprises" is the acquisition of the students theoretical knowledge and practical skills in the basics of design, construction and operation of systems and structures, as well as the environmental protection of water management of industrial enterprises (industrial water supply and water taking system of industrial enterprises) on the basis of modern achievements science and technology in this field.

Knowledge, skills, skills to complete the course
As a result of studying the discipline "Water supply and drainage of industrial enterprises," the student should be able to:

- - choose the rational systems and schemes of water management of industrial enterprises;
- - to design and calculate the system of water supply of industrial enterprises;
- - build and maintain structures of water supply for industrial enterprises.

know:

- - especially water supply of industrial enterprises;
- - systems and schemes of water supply of industrial enterprises;
- - cooling equipment industrial water supply systems;
- - supply of construction sites;
- - agricultural water supply;
- - methods for purifying industrial sewage;
- - methods of sludge treatment and utilization of the impurities of them;
- - the conditions for reuse of wastewater;
- - principles of revolving and closed water supply systems of industrial enterprises.

Estimate work in construction
CODE -CIV147
CREDIT - 6 (2/0/1/3)
Prerequisite - Building construction, construction technologies I, Mathematics I.

GOAL AND OBJECTIVES OF THE COURSE

The goal of teaching "estimate work in construction" - to provide the necessary amount of theoretical and practical knowledge on the valuation prices for construction products Investor - "Assessment of the object of the estimated cost of construction", "forward-looking estimated cost of construction of the object", "investor estimated cost of construction of the object" and parts of the contract or the contract price for construction products in a market economy, including the use of computer systems on personal computers.

It is an important task:

- development of methods and rules of formation of investor prices for construction products - OSSSO, TUEPB and ISSS;

- the acquisition of skills in the use of forms in the formation of the estimated main parts prices for construction products of the investor and the contractor;

-priobretenie source information transformation skills requirements of computer systems using personal computers.

BRIEF DESCRIPTION OF THE COURSE

Basic concepts of budget business. Develop and produce a full set of construction documents in accordance with the latest methodological requirements in two price levels - the base and the current composed of: local and object estimates; reports the volume and cost of works; summarizes the estimated construction cost estimates; resource estimates; local resource statements and local resource cost estimates.

Knowledge, skills, skills to complete the course

As a result of studying the discipline the student should know:

- estimate and regulatory framework of formation of prices for building production of the investor;

be able to:

- forming OSSSO, TUEPB and ISSS;

- forming the contract price for construction products in terms of construction, made in the process of construction (ie, as part of ISSS).

own:

- method of pricing for construction products and rules on the use of the investor regulatory information (estimate and regulatory) framework of their formation.

Energy-saving technologies in DVT systems
CODE - HYD150
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, hydraulics and aerodynamics, heat and mass transfer, heat-generating plants, heating and ventilation.

GOAL AND OBJECTIVES OF THE COURSE
classification of energy principles, energy mix, the general principles of fuel and energy resources (FER), measures for saving fuel and energy resources at the heat-generating plants, techniques and energy-saving means of the heating and ventilation system, urban and industrial waste, method of underground gasification of coal and processing low-grade fuels, the principles of the use of renewable energy resources in nuclear power plants produce energy fundamentals, the prospects MHD - generators.

BRIEF DESCRIPTION OF THE COURSE
The overall objective of the discipline is to train professionals working in the field of design, construction and operation of heat and ventilation systems.

Knowledge, skills, skills to complete the course
After mastering this discipline a student must:

- **Know:** Classification of energy resources; the energy balance of the structure; the general principles of saving energy resources; list of measures to save fuel and energy resources in heat-generating plants and the principles of their implementation; Methods and means for energy saving in air systems, air exhaust systems; the general principles in Energy use of agricultural, urban and industrial waste; Methods underground gasification of coal; embodiments ehnergotehnologicheskoj processing low grade fuels; principles for the use of solar energy, geothermal energy and wind energy; basics of energy production at nuclear power plants and nuclear cogeneration plant; the general principles and prospects of MHD generators; economic aspects of the use of energy-saving technologies.
- **be able to** - to assess the economic feasibility of the use of energy-saving technologies; evaluate the effectiveness of energy-saving measures in heat generating installations; develop measures for energy saving in heating systems; calculate air heat utilization system, removed from the premises and pick up equipment heat recovery units; to develop geothermal heating system and solar thermal systems to perform calculations.

Saving technologies in the VC systems
CODE - HYD164
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, chemistry, Building Materials, water chemistry and microbiology.

GOAL AND OBJECTIVES OF THE COURSE
Give theoretical and practical knowledge in the field of energy saving technologies in water and wastewater systems

BRIEF DESCRIPTION OF THE COURSE
- establishing concepts and tasks in the field of energy saving technologies in water and wastewater systems;
- learn the principles, methods, factors and indicators of material, energy and water saving
- economic evaluation of natural / water;
- organizational and legal framework for resource and water conservation in the Republic of Kazakhstan
- global trends and review of foreign countries' legislation in the field of resource and water conservation

Knowledge, skills, skills to complete the course
Use course knowledge to solve current and emerging issues in the field of energy saving technologies in water supply and sewerage systems in the Republic of Kazakhstan;
The student must know:
- basic terms and definitions in the field of energy saving technologies in water and wastewater systems;
- subject and tasks of discipline saving technologies in water supply and sewerage systems ";
- Material factors and indicators, energy and water saving
- main directions and ways to reduce material, energy and water resources

The student must be able to:
- use of the course knowledge to solve current and emerging issues in the field of material-energy and water conservation in the Republic of Kazakhstan;
- analyze the performance of use of material, energy and water resources in water supply and sewerage systems in the Republic of Kazakhstan;
- to assess the rational use of material, energy and water resources in water supply and sewerage systems;

Operation of water systems
CODE -**HYD 173**
CREDIT - 6 (2/0/1/3)
Prerequisite - mathematics, physics, chemistry, water supply, sewerage, water taking in Industrial systems, rational use of water, closed water system and operation of water and wastewater systems.

GOAL AND OBJECTIVES OF THE COURSE
Scheme integrated water management. System design stage. The starting materials and development works for the design. The composition of the survey work in the design of hydraulic structures. the design of water facilities requirements.

BRIEF DESCRIPTION OF THE COURSE
discipline "Operation of water management systems" provides insight into the theoretical foundations and basic provisions for Reconstruction, intensification and increasing the efficiency of water and wastewater systems, as well as environmental protection.

Knowledge, skills, skills to complete the course

- - to increase the effectiveness and quality of the water supply and drainage based on the reconstruction of buildings and improvements systems;
- - examine the ways and methods of implementation of elements of the intensification and reconstruction of engineering systems and facilities of water supply and sanitation;
- - conduct intensification, reconstruction of engineering systems and facilities of water supply and sanitation;
- - reduce consumption of material resources, as well as to promote the rational use and protection from pollution of their wastewater.
- In addition, the student must be able to:
- - to own the latest achievements of science and technology in the field of engineering systems of water supply and sanitation;
- - to use the method of determining the design parameters for the reconstruction processes intensification and engineering systems and facilities;
- - own features to improve the engineering systems and structures, on reconstruction of water supply and sanitation systems.

Seismic resistance of frame buildings
CODE -CIV196
CREDIT - 6 (2/0/1/3)
prerequisite -

GOAL AND OBJECTIVES OF THE COURSE

The purpose of the discipline "Seismic Frame Buildings" - the development of knowledge and skills of students required for the design and construction of frame buildings in earthquake zones.

discipline tasks:

- the development of the theory and practice of calculations of buildings and structures on the seismic loads;
- the acquisition of knowledge about the basic principles of earthquake engineering;
- the acquisition of skills of analysis of structures to seismic loads using software packages.

BRIEF DESCRIPTION OF THE COURSE

This course is a special discipline that studies the methods of construction of frame buildings in seismic conditions.

Knowledge, skills, skills to complete the course

As a result of studying the discipline the student should know:

- methods and ways of building processes technology in the performance of concrete and concrete works in the earthquake-prone areas;
- especially the construction and erection of frame buildings in seismic regions.

be able to:

- establish the composition of the working operation and construction processes, reasonably choose the method of execution of the construction process the necessary facilities;
- to determine the complexity, mashinoemkost construction processes required amount of workers, machines, materials, semi-finished products and products;
- to determine the scope of work, to make the work performed, and to exercise control over their quality.

own:

- best practices and practical skills of organization and production of all kinds of mechanized operations, technologies, ensuring the effectiveness of the construction of frame buildings in earthquake-prone areas.

The technology of construction of monolithic buildings
CODE -CIV150
CREDIT - 6 (2/0/1/3)
Prerequisite - Technology of erection of buildings and constructions, building production I. Technology

GOAL AND OBJECTIVES OF THE COURSE

The aim of the course is to examine the students the basics in theory and practical implementation of the rules of the complex of construction and ontazhnyh works in the construction of monolithic buildings.

To implement postavlennory goals in the process of teaching the course slkduyuschie solved the problem:

- Analysis of the technology of construction of underground facilities in urban areas;
- Analysis of advanced technology monolithic demostroeniya.

BRIEF DESCRIPTION OF THE COURSE

This course gives theoretical basics, methods and ways of construction of monolithic buildings. Consistently the general questions of construction technologies, construction of underground structures, buildings and constructions of structures prefabricated reinforced concrete with the use of modern industrial formwork, technology of construction of buildings in dense urban areas, to technologically-contaminated areas, and in extreme winter conditions.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- modern technologies of construction of buildings and structures;
- the main methods of execution of certain types of facilities and construction and installation works;
- the basic methods of linking technological construction and installation works;
- method of designing the main process parameters at different stages of the erection of the building;
- the content and structure of the production of projects of construction of buildings and structures.

be able to:

- to project a common and specialized manufacturing processes;
- develop a schedule for construction and installation works;
- develop a general plan of the building at different stages of the construction of buildings and structures;
- to form the structure of the construction work;
- to carry out the variant design technology of construction of buildings and structures;
- to develop projects of construction and installation works.

own:

- ability to develop operational plans for the work of primary production units;
- to conduct analysis of the costs and results of production units;
- compile the technical documents.

Inspection and testing of buildings and structures
CODE -CIV140
CREDIT - 6 (2/0/1/3)
Prerequisite - Management and organization of construction, Organization of construction technology of construction of buildings and structures.

GOAL AND OBJECTIVES OF THE COURSE

Formation of knowledge and practical skills for the work connected with the examination of the actual technical state of the structures of existing buildings and the design of amplification of defective and damaged structures.

The purpose of discipline*:*

- preparation of a civil engineer, is able to conduct a survey and test facilities operated;
- to carry out diagnostics of building structures and buildings;
- choose methods of rehabilitation and reconstruction of facilities in accordance with the changing operating conditions;
- prepare a specialist who knows the principles of optimal experimental design, able to establish a correspondence between the actual work of construction and its calculation model, familiar with the test equipment and methods of its practical use.

Problems of the discipline:

- mastery of the principles and techniques of survey designs, their diagnosis and assessment of their load-carrying capacity;
- the skills of full-scale tests and determination of physico-mechanical properties of Building Materials and structural elements;
- the development of skills and knowledge to restore the serviceability of buildings and structures in connection with their repair or reconstruction;
- mastering the principles of engineering experiment to test designs, research planning, organizing and processing the results.

BRIEF DESCRIPTION OF THE COURSE

This course, which comprehensively addresses issues of teaching students the theoretical foundations and practical skills in technology survey (diagnosis) and testing of structures and materials. It involves determining diagnostic volumes, the sequence of execution of work process steps during the examination and testing of structures depending on the purpose, to make practical design diagrams, measurement elements, consideration of factors that reduce the bearing capacity of structures and materials. Discipline examines the main circuit designs, characteristic of damage to buildings, facilities, structures of control, general examination, a detailed examination and testing of structures and materials.

Knowledge, skills, skills to complete the course

As a result of studying the discipline the student should know:

- nondestructive testing methods to determine the basic physical and mechanical characteristics of the metal, concrete, wood and plastics in building constructions and articles;
- instruments and equipment for inspection and testing of construction structures and materials;
- to know how to restore the bearing capacity and serviceability of the structures of buildings and structures.

be able to:

- assess the technical condition, the reliability of the structures of buildings and structures in their examination;

- to assess the actual load-bearing capacity, reliability and quality of the structures of buildings and structures at their trial;

- the right to apply various types of instrumentation, install and configure devices on the test design, read the readings in surveys and tests of building structures;

- prepare technical reports and opinions on the state of the structures of buildings and structures on the survey results and perform the processing of the results of static and dynamic testing of structures and building systems.

own:

- procedure of works on engineering tests of constructions, buildings and structures, know the characteristics of the tests of static and dynamic loads;

- means of flaw detection methods and constructions, controlling the physical and mechanical properties of materials in the constructions;

- the method of engineering survey of building structures and buildings.

Technology reconstruction of the building
CODE -CIV184
CREDIT - 6 (2/0/1/3)
Prerequisite - Architecture, Physics I, Mechanical Engineering.

GOAL AND OBJECTIVES OF THE COURSE

The purpose of teachingIt is the formation of professional knowledge and practical skills required of future bachelor.

The object of the course is the presentation of the foundations for building objects reconstruction mastering Bachelor knowledge and skills in the field of technological design and direct the work on the reconstruction of residential, civil, industrial buildings and structures with the use of modern materials, structures, technologies, machines and mechanisms.

BRIEF DESCRIPTION OF THE COURSE

Technology reconstruction n structures - it is their reorganization with a view to a partial or complete change in the functional purpose, the installation of new efficient equipment, improve the development of territories,conform to the modern increased regulatory requirements.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- fundamentals and technology challenges of reconstruction of buildings and structures;
- types and characteristics of building processes in the reconstruction of buildings and structures;
- required resources; technical and tariff standardization; requirements for the quality of construction products and methods of its security;
- requirements for safety; methods and means of technology of reconstruction of buildings and structures, including regular and extreme conditions;
- method selection and documentation of technological solutions in the design phase and the implementation phase.

be able to:

- establish the composition of the working operations and construction processes in the reconstruction of buildings and facilities, reasonably choose the method of execution of the construction process and the necessary technical means;
- to determine the complexity, mashinoemkost construction processes and the required number of workers, machines, materials and semi-finished products

Design and calculation of special buildings
CODE -CIV152
CREDIT - 6 (1/0/2/3)
Prerequisite - Concrete Structures 1, Metal structures I, Architecture.

GOAL AND OBJECTIVES OF THE COURSE

The purpose of teaching "Design and calculation of special buildings" as a discipline of choice for specialty 6B0730 «Building and manufacture of building materials and structures" is to familiarize students with the fundamentals of calculation and design of special facilities (tanks, bins, silos, water towers, etc.)..

BRIEF DESCRIPTION OF THE COURSE

The subject of "Design and calculation of special buildings" - a course that studies the architectural solutions, as well as issues of design and analysis of various types of engineering structures, which are the functional characteristics include the following groups: structures for supporting and placing equipment; communications and transport structures - tunnels, canals, sewers, props and trestles; capacitive structures for water drain; water towers, tanks, gas tanks; silos, bunkers, chimneys, retaining walls, and others. We also consider the significance and role of engineering structures to create an image of modern industrial enterprises. As practice shows, the expressiveness and the silhouette The enterprise was in all cases depends not only on the architectural decisions of individual buildings, but also on their interactions with engineering structures.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- species of special buildings;
- particularly space-planning and designs of special structures;
- fundamentals of calculation and design of special facilities.

be able to:

- to determine the internal forces in various types of special facilities;
- the right to design various types of special facilities;
- find and use scientific and technical information.

Metal structures Mounting Technology
CODE -CIV180
CREDIT - 6 (2/0/1/3)
Prerequisite - Metal Constructions I, technology of construction of buildings and structures.

GOAL AND OBJECTIVES OF THE COURSE

The purpose of teaching is to develop the fundamental knowledge required for mastering the techniques of metal structures installation.

In the process of training students acquire general theoretical methods of productions, research and solve problems related to the installation of metal structures; acquire skills to work with lifting equipment, welding equipment, as well as skills to solve practical problems of metal structures installation.

BRIEF DESCRIPTION OF THE COURSE

Formation of professional knowledge and skills necessary for the installation of metal structures technology; development and study of modern methods of metal structures installation that must be met to a certain processing sequence, in order to get the minimum term of construction quality and economical construction products. Developing skills for qualitative performance of technology mounting of metal constructions using construction equipment in the construction of buildings and structures. Installation of the elements of metal structures, installation of metal spatial and high-rise structures.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- work materials, elements and compounds, design principles, bases fabrication and erection of structures;
- installation of foundations of steel-framed industrial buildings (including buildings of complete delivery from light metal structures) and their reconstruction;
- the basics of installation of metal structures of buildings and structures for various purposes, taking into account the characteristics of their operation and design solutions.

be able to:

- the use of modern research methods to solve professional problems;
- independently handle, interpret and present the results of research and production activities in the field of metal constructions assembly technology.

own:

- own methods to solve research and production problems in the installation of metal structures.

Estimation of seismic stability of buildings and constructions
CODE -CIV408
CREDIT - 6 (2/0/1/3)
Prerequisite - Mechanical Engineering - 2, Building construction, Building design-1, Mechanical Engineering, Estimation of seismic stability of buildings and structures.

GOAL AND OBJECTIVES OF THE COURSE

The purpose of the discipline "Estimation of seismic stability of buildings and structures" - the development of students' knowledge and skills necessary for the design and construction of unique buildings in earthquake zones.

discipline tasks:

- the development of the theory and practice of calculations of buildings and structures on the seismic loads;
- the acquisition of knowledge about the basic principles of earthquake engineering;
- the acquisition of skills of analysis of structures to seismic loads using software packages.

BRIEF DESCRIPTION OF THE COURSE

Discipline "Estimation of seismic stability of buildings and structures" as an independent branch of science was formed recently. Earthquake engineering, construction, carried out in areas prone to earthquakes, taking into account the impact on buildings and structures seismic (inertial) forces. The study of this discipline forms the knowledge of calculation and design of earthquake-resistant buildings and complements them with regard to the study of modern approaches to the calculation and analysis of stress-strain state of the structures and their mating components under seismic actions.

Knowledge, skills, skills to complete the course

As a result of studying the discipline the student should know:

- the basic laws of the dynamic behavior of structures during earthquakes;
- theoretical foundations and basic methods of calculation algorithms structures on seismic effects;
- the basic principles of design and implementation of seismic stability of buildings and structures during earthquakes;
- designs of earthquake-resistant buildings and structures;
- social, ecological and economic consequences of the earthquake.

be able to:

- develop constructive measures to ensure the seismic resistance of buildings and structures;
- a circuit for the calculated amount of complex engineering structures and their components when performing dynamic and seismic calculations;
- to analyze and evaluate the results obtained by computer calculations of structures on the seismic loads.

be skilled in:

- perform dynamic calculations of constructions methods of structural mechanics;
- performing dynamic calculations structures using modern software systems.

Management and organization of building production
CODE -**CIV189**
CREDIT - 6 (2/0/1/3)
Prerequisite - Technology of erection of buildings and constructions, construction technologies I, Quality control of building installation work

---

GOAL AND OBJECTIVES OF THE COURSE

In the course of this course the student should obtain theoretical knowledge and practical skills in the field of construction as an industry, namely those involved in the investment process, what are the links between them and their responsibilities. It is also necessary to teach students best practices in construction and installation works in the construction of industrial and civil objects.

The aim of this course is to train qualified experts and organizers of production, knowing bases of the organization who are able to use them in the future practice in construction companies.

BRIEF DESCRIPTION OF THE COURSE

It sets out basic information on the organization of construction process; design of construction organization and preparation for construction; basics of the production organization of the construction; scheduling of construction on the project; organization of geodetic works on the construction site; stroygenplana object; quality control of the construction.

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know and be able to:

- advanced methods of construction and installation works in the construction of industrial and civil objects;
- the existing system of preparation of construction production;
- an existing software system and a complete set of construction companies with material and technical resources;
- a system of operational planning and building control room production control system;
- methods of modeling of building production;
- The organization of design and prospecting the raw data and the composition of the PIC, PPR, ERP;
- Develop the main sections of CPD for individual buildings and structures, know the principles of development of the main parts of the POS and ERP;
- stroygenplana design of individual buildings and structures;
- to develop linear and network diagrams the construction of buildings and structures with the given limitations;
- ensure the quality of construction and installation works.

Autonomous heating system
CODE - HYD180
CREDIT - 6 (1/0/2/3)
Prerequisite - Hydrology and flow control, Hydraulics, Hydrometry, Irrigation reclamation, Building Materials.

GOAL AND OBJECTIVES OF THE COURSE
The development of knowledge and skills required to implement design solutions in the construction of water facilities.

BRIEF DESCRIPTION OF THE COURSE
- General information about the technology and the organization of works on water
- The main objects of the work on water.
- Participants work on water use and the relationship between them
- System of normative documents, documentation and organization of construction production work on water.
- Sources of financing of water management
- Work in the construction of structures for various purposes
- The life cycle of the project works on water
- Production of construction and installation works.
- construction management of the organization.
- Control and recording of the production of works on water
- The Nature Conservancy in the production of works on water
- Delivery of water objects

Knowledge, skills, skills to complete the course
As a result of studying the discipline, students should:
- **know -** basic, modern schemes and structures of special water treatment methods
- **To be able to -** to put into practice the theoretical knowledge and skills; use a method of determining the calculated parameters of the main equipment systems; count and match elements of the basic equipment and engineering systems of buildings and the environment.

Local water and sanitation systems
CODE - HYD131
CREDIT - 6 (1/0/2/3)
Prerequisite - Hydrology and flow control, Hydraulics, Hydrometry, Irrigation reclamation, Building Materials.

GOAL AND OBJECTIVES OF THE COURSE
The development of knowledge and skills required to implement design solutions in the construction of water facilities.

BRIEF DESCRIPTION OF THE COURSE
- General information about the technology and the organization of works on water
- The main objects of the work on water.
- Participants work on water use and the relationship between them
- System of normative documents, documentation and organization of construction production work on water.
- Sources of financing of water management
- Work in the construction of structures for various purposes
- The life cycle of the project works on water
- Production of construction and installation works.
- construction management of the organization.
- Control and recording of the production of works on water
- The Nature Conservancy in the production of works on water
- Delivery of water objects

Knowledge, skills, skills to complete the course
As a result of studying the discipline, students should:
- **know -** basic, modern schemes and structures of special methods of preparation of potable water (desalination, iron removal, decontamination) and action systems in small wastewater treatment plants
- **To be able to -** to put into practice the theoretical knowledge and skills; use a method of determining the calculated parameters of the main equipment systems; calculate and pick up the basic elements of engineering equipment and water treatment systems and sanitation and environmental protection.

hot water systems in buildings
CODE - HYD157
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, engineering systems I, heating, heat-generating plants, heat and gas networks.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching "Hot Water Systems" is the acquisition of the students theoretical knowledge and practical skills in design, device hot water systems.

BRIEF DESCRIPTION OF THE COURSE
Discipline "hot water systems" provides the basic theoretical knowledge and basic design and provision of hot water supply device.

Knowledge, skills, skills to complete the course
As a result of studying the discipline "hot water systems" the student should know:
- theoretical bases and methods for determining the estimated hot water consumption;
- bases of designing hot water systems, their scheme;
- technique hydraulic calculations hot water supply systems;
- the equipment used, and their design.

be able to:
- to put into practice the theoretical knowledge and skills;
- use computational methods for determining indicators for the design of hot water supply systems of buildings;
- design scheme piping hot water supply system;
- perform hydraulic calculations of pipelines;
- the use of modern technology in hot water applications.

Disposal of wastewater and sludge
CODE - HYD154
CREDIT - 6 (1/0/2/3)
Prerequisite - water chemistry and microbiology, technology, natural and waste waters, physics, chemistry, engineering systems 2, trasportirovanie water.

GOAL AND OBJECTIVES OF THE COURSE
Based on the study teoreticheskihaspektov recycling wastewater and sludge to teach students to design and technology selection of technological schemes and methods of treatment and disposal of sediments.

BRIEF DESCRIPTION OF THE COURSE
"Disposal of sewage sludge "examines the technological scheme of sewage sludge of various industrial plants, design and construction calculations.

Knowledge, skills, skills to complete the course
Students need to know:

- bases of designing modern systems of processing of deposits;
- Methods of calculation of hydraulic pump silt and iloprovodov station;
- oznokomlenie modern processes of sludge treatment.

Purification of gaseous emissions
CODE - HYD148
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, hydraulics and aerodynamics, heat and mass transfer, heat-generating plants and ventilation.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of the discipline is to train professionals working in the field of design, construction and operation of heat and ventilation systems.

BRIEF DESCRIPTION OF THE COURSE
Structures atmosphere singularities occurring therein meteorological processes, quality criteria (purity) Outside, the influence on the environment polluting emissions, methods of calculating their number, factors which determine the conditions for effective dispersion of harmful emissions in the atmosphere and modern gas cleaning methods particulate and toxic gas components, devices, and operating principle of the modern gas cleaning equipment as well as economic aspects of the use of nature protective measures.

Knowledge, skills, skills to complete the course
As a result of studying the discipline, students should know:

- the nature of the effects of pollutants in the biosphere;
- structure of the atmosphere; basic concepts turbulence theory and turbulent diffusion in a stratified atmosphere;
- method for determining the hydrodynamic and thermal recovery ejection string;
- valuation principles of air quality;
- classification emission sources;
- method of calculating total emissions of pollutants and their fields of surface concentrations;
- methods of determining the emission limit values;
- gas cleaning methods particulate and gaseous toxic ingredients;
- Design and function of modern pollution control equipment;
- objectives and methods of environmental control and the principles of sub-development projects "Air Pollution Control".

be able to:

- determine air parameters and to evaluate the nature of contaminants influence on the biosphere;
- calculate the parameters of wind flow over the ground surface and a height of hydrodynamic and thermal jet ejection recovery pollutants;
- calculate gross pollutant emissions, their fields to surface concentrations and the required height of emission source;
- calculate and produce equipment selection for gas cleaning particulate and gaseous toxic ingredients;
- to assess the economic damage caused by air pollution.

Protection of water resources
CODE - HYD146
CREDIT - 6 (1/0/2/3)
Prerequisite -osnovy water use and protection of water resources, integrated water resources management, industrial water supply and drainage, engineering hydrology, hydroecology.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of the discipline: to give theoretical and practical knowledge in the management, protection of water resources, water cadastre and water monitoring.

BRIEF DESCRIPTION OF THE COURSE
Establishing the concepts and spirit of the water inventory, environmental monitoring and water;

- oznokomlenie with the state system of hydrometeorological observations and environmental monitoring, metering water use, water cadastre, as well as United State Environment Monitoring System and Natural Resources (EGSM ERP)
- study of the environmental monitoring program planning methods
- familiarize with the state environmental monitoring problems of the environment and water management abroad;
- General characteristics of natural sources.
- Requirements for water supply sources.
- The sanitary quality of water of different sources.
- The influence of human economic activity on the state of water sources.

Knowledge, skills, skills to complete the course
development of the students basic terms and definitions in the field of use and protection of water resources; analysis and synthesis of indicators of structure and dynamics of water use and protection

- **Know:**classification of water use; features of formation and factors affecting water use and sanitation in the city and industries; Methods rationing water consumption and water removal; water protection regulations; vision and strategy of the national water policy, the most important programs and projects for implementation.
- **be able to:**use rate of knowledge to solve today's issues of water use and sanitation in the Republic of Kazakhstan; analyze the performance of the structure and dynamics of water use and protection in the Republic of Kazakhstan; to assess the rational use of water for drinking and industrial needs; work with experimental and statistical data on water consumption and wastewater.

The use of groundwater resources
CODE - HYD 128
CREDIT - 6 (1/0/2/3)
Prerequisite - Fundamentals of geology and hydrogeology, gidrogeodinamika, water intake structures of surface and groundwater artificial replenishment of groundwater reserves, water resources management.

GOAL AND OBJECTIVES OF THE COURSE
The subject, goals and objectives of the course. The history of the use of groundwater resources. The use of groundwater for water supply. Mine wells. Tubewells. Besfiltrovye well. Pumps. Irrigation groundwater. The use of groundwater as thermal resources. Using industrial groundwater as mineral resources. The use of mineral underground waters in the spa treatment.

BRIEF DESCRIPTION OF THE COURSE
familiarization of students with the general and specific issues Groundwater, including .: various water systems, types and designs intake groundwater methods improve water quality, mechanical and chemical cleaning and decontamination processes, protection from pollution of groundwater; processes for recovering useful substances from mineral groundwater; Principles of mineral and thermal waters.

Knowledge, skills, skills to complete the course
- teach students theoretical foundations for the organization of the use of groundwater, to acquaint them with those of the relevant departments of the regulatory and technical documents regulating the process of water use of groundwater, as well as instill in them the practical skills to conduct engineering analysis of individual components and systems using groundwater as a whole .
- theoretical basis and practical skills to implement engineering design of individual components and systems, the use of groundwater as a whole
- to solve practical problems of water supply of settlements, industrial and agricultural facilities.

Ventilation of industrial buildings and structures
CODE - HYD104
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, physics, chemistry, engineering systems, heat and mass transfer, building thermal physics, heating, heating, ventilation and air conditioning.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of the discipline: to give theoretical and practical knowledge in the field of ventilation of industrial buildings and constructions.

BRIEF DESCRIPTION OF THE COURSE
Discipline "Ventilation of industrial buildings and structures" reflects the currentstate of the theory and practice of applied aerodynamics and thermo ventilation; it sets out the basis for calculating the design, installation and operation of the ventilation building. We consider properties of the air and process changes its state, ventilation and air distribution organization indoor local exhaust and supply air, the design and operation of devices of ventilation systems.

Knowledge, skills, skills to complete the course
As a result of studying "Ventilation of industrial buildings and structures" discipline a student must:

- **Know**sanitary, technological bases of ventilation; particularly drawing up the heat and air balance of the premises; methods of determination and organization of air in the room; equipment for thermal, processing and humid air purification; the system of local and general dilution ventilation and air extraction;
- **be able to**solve the problems associated with creating and maintaining the required parameters of the internal air environment; apply modern principles of designing effective ventilation devices; to choose a comfortable environment in the room; select the calculated air parameters; to carry out the reconstruction and maintenance of ventilation systems; use energy savings with modern equipment.

Closed water systems
CODE - HYD123
CREDIT - 6 (1/0/2/3)
Prerequisite - industrial water supply and drainage, hydraulics, chemistry, water cadastre, hydrology and runoff control, the basics of geology and hydrogeology, hydroecology, based on water use and protection of water resources.

GOAL AND OBJECTIVES OF THE COURSE
Give theoretical and practical knowledge of the study of methods for solving specific tasks of engineering practice in the design, construction and operation of water supply systems of industrial enterprises.

BRIEF DESCRIPTION OF THE COURSE
Features industrial water supply systems. Circuits and industrial water systems. Basic principles of closed water circulation systems. the balance of water in the water system. Rational circuit water recycling flotation concentrators. Creation of closed water supply systems in thermal power plants. Creation of closed water systems in the iron and steel enterprises. Creating a closed system of water supply enterprises of nonferrous metallurgy. Creating a closed refinery supply systems. The cooling device of circulating water systems. Rationing of water consumption and wastewater industry.

Knowledge, skills, skills to complete the course
The development of the students basic knowledge in the design and operation of water supply systems at industrial enterprises,
knowledge in the design and operation of water supply systems in industrial plants, as well as to teach them to rely on their own basic facilities of water supply systems of industrial enterprises.
The student should know:

- usedevice supply systems of industrial enterprises, hydraulic relationship between the individual elements; basics of operation of facilities; requirements for water quality, and supplied to the consumer discharged after use to water or coming into closed and circulating system: modern methods and structures for natural and waste water and neutralizing them.

The student should be able to:

- use knowledge of the course for use by deep processing of natural water pollution, modern methods of treatment and post-treatment of domestic and industrial waste water for subsequent use in water recycling systems.

Water management
CODE - HYD163
CREDIT - 6 (1/0/2/3)
Prerequisite - Informatics, Chemistry, Hydrometry, Engineering Hydrology, Geoecology, Hydroecology.

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching is to give theoretical and practical knowledge in the field of rational use and protection of water resources.

BRIEF DESCRIPTION OF THE COURSE
The main objectives of the course:

- establishing the concept and essence of water use, water use and protection of water resources;
- familiarization with the classification of water use;
- study of water consumption and wastewater analysis methods;
- study of the factors and patterns of water use and sanitation in the city;
- study of water consumption and water content in the sectors of the economy;
- familiarize students with the problems of water management and water protection in the Republic of Kazakhstan;

Knowledge, skills, skills to complete the course
As a result of studying the discipline the student should know:

- Basic terms and definitions in the field of use and protection of water resources;
- The object and purpose of discipline "Management of water resources";
- SUMMARY greening water;
- Classification of water use;
- Features of formation and factors affecting water consumption in the city and industries;
- Indicators of use and protection of water resources, methods of calculation of the level, structure and dynamics;
- Vision and strategy of the national water policy, the most important programs and projects for implementation.

be able to

- use rate of knowledge to solve today's problems and future water use and sanitation in the Republic of Kazakhstan;
- analyze the performance of the structure and dynamics of water use and protection in the sectors of Kazakhstan's economy;
- to assess the rational use of water at the present level and to determine future needs in the various sectors of the economy;
- work with experimental and statistical data on water consumption and wastewater;

Protection of the thesis / degree project
CODE -
CREDIT - 6
Prerequisite - no

GOAL AND OBJECTIVES OF THE COURSE

The main aim of the thesis / design is to systematize and deepen the knowledge acquired by students of all time university studies, the development of computational and engineering skills of the designer, the preparation for the independent decision of engineering problems in the design and construction of buildings and structures, as well as the design and calculation of the production building materials, products and structures.

The objectives of the thesis / design includes the development of each graduate student of all parts of the project in strict accordance with the approved six individual tasks and the proper execution of drawings and settlement and the explanatory note submitted by the defense.

BRIEF DESCRIPTION OF THE COURSE

Diploma thesis / project - independent work aimed at solving specific technical problems encountered in the design and construction of buildings, production of building materials. The work on the diploma work / project consists of two phases - pre-diploma practice and diploma projects. Thesis - independent scientific research aimed at studying actual scientific and technical problems to produce concrete results with scientific and practical significance in the field of construction. Performed thesis / project under the individual plan, issuing department.

Knowledge, skills, skills to complete the course

- mastering the technique of analysis, research and experimentation to solve practical problems;
- the development of skills of independent work with the normative and technical documentation, instructional materials and scientific literature;
- the acquisition of correct statement of problems, the formalization of the tasks of research and findings;
- mastering the skills of practical work in the field of design and calculation of building designs, construction technologies, planning the construction process of building organizations, technology and calculation of building materials, products and structures;
- correctly apply the theoretical principles of technical and professional disciplines;
- be able to use modern methods of technical and economic analysis;
- competently perform specific organizational and economic calculations;
- to apply advanced methods of investigation, to introduce the achievements of science and technology and management and justify the economic feasibility of their implementation.

Content

fluid mechanics	51
Computer graphics in construction drafting	52
Architecture and construction of industrial buildings and structures	53
Design and calculation of structural elements	54
Foundations	56
Concrete Structures II	57
Heating	58
wastewater treatment technology	60
Metal structures II	61
water Transportation	62
heat supply	63
The technology of construction of buildings and structures	64
Design and calculation of special buildings	65
The technology of building production I	66
The technology of water purification	67
Heat-generating installation	68
Reliability of building structures	69
Professional computer software and information technology in construction	70
Modern computer simulations	71
The technology of building production II	72
Design and calculation of structures pronstranstvennyh	73
Quality control of building installation work	74
Concrete coating pronstranstvennye	75
Ventilation and Air Conditioning	76
Drainage network	77
The construction of earthquake-resistant buildings	78
Geotechnics II	79
Thermal and gas networks	80
Water treatment in boilers and heat networks	81
Industrial water supply and sewerage	82
Estimate work in construction	83
Energy-saving technologies in DVT systems	84
Saving technologies in the VC systems	85
Operation of water systems	86
Seismic resistance of frame buildings	87
The technology of construction of monolithic buildings	88
Inspection and testing of buildings and structures	89
reconstruction of the building technology	90

Design and calculation of special buildings	91
metal structures Mounting Technology	93
Estimation of seismic stability of buildings and constructions	94
Management and organization of building production	95
Autonomous heating system	96
Local water and sanitation systems	97
hot water systems in buildings	98
Disposal of wastewater and sludge	99
Purification of gaseous emissions	100
Protection of water resources	101
The use of groundwater resources	102
Ventilation of industrial buildings and structures	103
Closed water systems	104
Water management	105
Protection of the thesis / degree project	106